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Improvement in Devices for Raising Liquids.

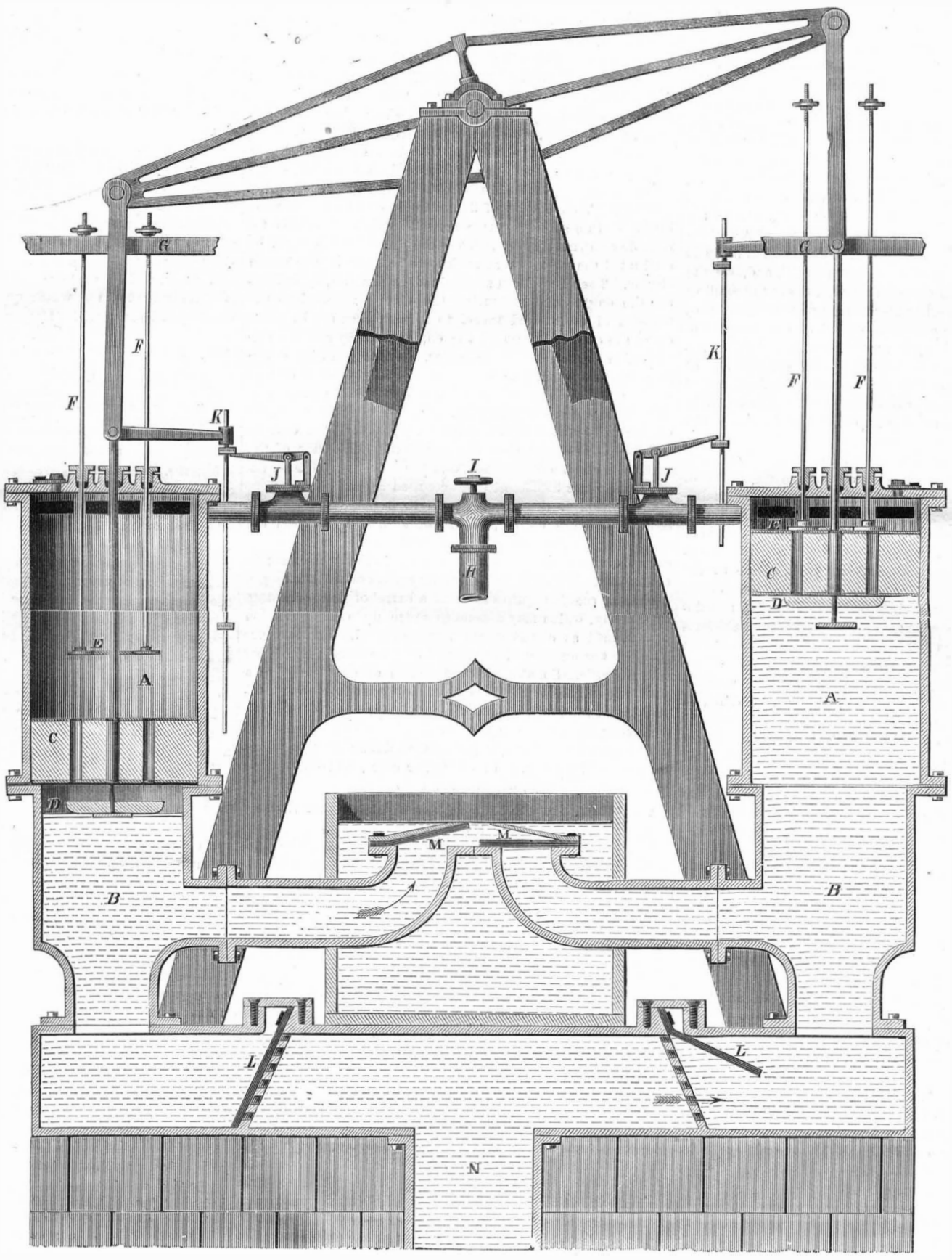
The application of natural laws and well-known principles to practical use is the peculiar domain of the inventor and mechanic, and it detracts nothing from the merit or value of an invention or machine that no new principle is established or no new law discovered, if it utilizes either one, although both may be old and well known. Indeed, this faculty of putting to practical use truths which may have been generally known, but which have not heretofore been harnessed and and made to add to human advancement, constitutes mainly the value of the talent of the inventor and the skill of the mechanic. A knowledge of natural laws is very well, but only when that knowledge is usefully employed is it really valuable, except for the exercise and discipline the intellectual faculties have received in its acquirement. But the inventor must not only have acquired this knowledge, but must also put it to practical use in its application to some practical device.

These remarks receive an illustration in the machine represented in the accompanying engraving. It is an adaptation of the well known laws governing the formation of a vacuum by the condensation of steam, and the lifting of water or any other liquid by the over balance of a column of atmospheric air.

Water held in an inclosed vessel air tight will not descend, even if the lower portion of the vessel is open, so long as this opening is beneath the surface of water in a lower vessel. This is often illustrated by a common experiment of filling a tumbler and a bottle with water and inserting the neck of the latter in the former. It matters not what the relative volume of the two may be, their contents will be, to all intents and purposes, one solid column, and the contents of the higher vessel, however much greater, will not affect the lesser and lower volume, until air is admitted, when the equilibrium is destroyed and the contents of the upper vessel obey the law of gravitation and descend. Now this heavier and upper column of water is held suspended, or is lifted by the weight of the atmosphere, and until a limit of about thirty feet in hight is reached this action of the atmosphere is the same, and the column would not only be held at that hight but be raised to that hight by the atmospheric pressure.

This is the principle of the common lifting pump. But in raising large volumes of water, and especially when the hight exceeds the action of the atmospheric pressure and to this is added the necessity of forcing it a still further hight, the general practice has been to apply the power—steam or otherwise—directly to an engine that drives the pumps, which are usually combined lifting and forcing pumps. It is evident that the amount of power thus used must be greater than if the action of the atmosphere was also employed.

The pumping engine herewith illustrated uses the atmospheric pressure mainly as the means of raising water, steam being employed simply to assist. The engraving is a vertical section of Reynolds' steam condensing, water elevating engine, the machine being double and the pistons being reciprocatory in action by means of a walking beam. The cylinders, A, may be called the steam cylinders, although they also receive water. These are bolted to the lower or condensing cylinders, B. In the upper cylinders are plungers, C, of wood, which merely float on the surface of the water in the cylinders. These plungers or pistons are pierced through with a series of holes forming passages for the water. On the lower side these may be closed by a floating valve, D, and on the upper side by a metallic ring valve, E, guided in its vertical movement by the rods, F, passing through stuffing boxes in the upper cylinder head. The bars, G, are portions of a permanent frame serving as guides for the rods, F. H is a steam pipe furnished with a gate, I, and having two branches, in each of which is a trip valve, J, operated by lugs on the lifting rods, K. This reference to the parts will be sufficient for a comprehension of the operation of the machine, as the use and action of the valves, L and M, will be obvious.



REYNOLDS' STEAM CONDENSING AND WATER ELEVATING ENGINE.

The water enters at N, from any source not more than twenty-five feet below the machine. Following the direction of the arrow, it fills the cylinder on the right, as seen, its upward pressure holding the floating valve, D, against the bottom of the floating piston, C, the two combining to form a solid plunger. The central piston rod rises with the piston and carries with it the lifting bar, K, the lug on which opens the lever, J, when the piston has nearly reached the top of the cylinder, and thus the steam is admitted to the cylinder above the piston. The pressure of the steam on the valve, E, and piston, C, forces them down until the nuts on the top of the guide rods, F, strike on the frame, G, when the valve is lifted, as seen in the left-hand cylinder, and the water and steam rush down, the descent of the former being due to the force of gravity—it having a fall of about five feet—and the steam being almost instantly condensed as it comes in contact with the water, thus forming a vacuum above the piston, C. The downward rush of the water closes the inlet valve, L, and the water is delivered to the tank, in the direction of the arrow, through the valve, M. Now the return stroke is produced, soon as the downward stroke is completed, by the atmospheric pressure lifting the water into the vacuum caused by the condensation of the steam. The first product of the effort is a closing of the valve, D, permitting no water to pass above the piston, and by means of the cap valve, E, closing as soon as the plunger reaches the position of the suspended valve, making again a solid piston for the action of the steam. It will be seen that all the movements are automatic and that a description of a single reciprocating stroke explains the continuous action of the combined machine.

The inventor asserts that the condensation and consequent forming of a vacuum is so rapid that he has been enabled to produce fifteen strokes per minute with a pressure of only from ten to fifteen pounds of steam, raising water to a hight of twenty-five feet. The engine would operate with very much less steam, although not so rapidly, as the momentum of the water is accelerated by the steam pressure, yet a larger amount of steam has to be condensed to create a vacuum, which, however, is assured by the large surface of the condensing cylinder. This cylinder is kept continually cool by a non-conducting packing between that and the upper cylinder, aided by the non-conducting material of the plunger and its lower valve. It will be noticed, also, that the lower or condensing cylinder is kept continually filled with water, the

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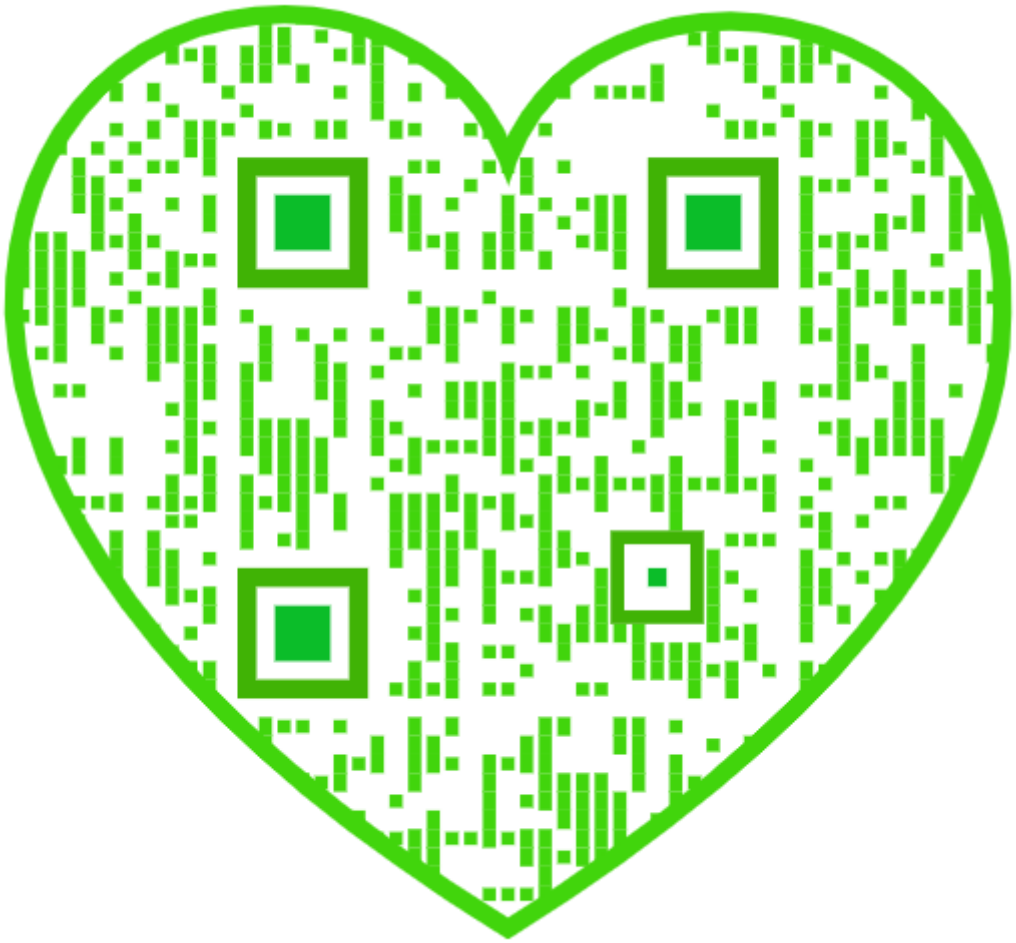

level of which corresponds with that of the water in the receiving tank. Surplus steam, air, and gases are forced out through a check valve in the top of the upper cylinder by the momentum or hammer of the water, obviating the necessity of air pumps, siphons, or similar contrivances, and making a very cheap and direct-acting device for raising water. For draining mines, wrecking purposes, pumping for railroads, elevating water for supplying cities, towns, and villages, and for producing a water power by creating a head, this machine is believed to be applicable and efficient. Forty-five barrels of water can be raised twenty-five feet high per minute with this machine and a ten-horse power boiler carrying twenty-five pounds of steam.

Patented Oct. 27, 1868, by A. J. Reynolds, who may be addressed at the Detroit Locomotive Works, Detroit, Mich., or Reynolds & Newell, 17 Maiden Lane, New York city.

THE BEST MODES OF TESTING THE POWER AND ECONOMY OF STEAM ENGINES.

BY CHARLES E. EMERY, LATE OF THE U. S NAVY AND U. S. STEAM EXPANSION EXPERIMENTS.

Read before the Polytechnic branch of the American Institute, Oct. 22, 1868.

(*Continued from page* 342.)

The anthracite, as a rule, contains much more refuse than the other varieties. The English coals probably average 10 per cent of waste; the West Pennsylvania and Ohio coals have only 5 per cent, and the maximum of our bituminous coals rarely exceeds 13 per cent. On the contrary, the refuse from anthracite rarely falls as low as 10 per cent and often reaches to 24 per cent, so that, on the average, its waste is double that of the bituminous varieties. It will therefore be interesting for us to examine the results produced by the combustible portions of the different kinds of coal. The part consumed is called the "combustible," and is found by deducting from the weight of the coal the weight of the ashes, clinkers, soot, etc., which can be collected after the trial. Referring again to the Navy Experiments, we find that the mean evaporative efficiency of thirteen varieties of American anthracite combustible was equal to the evaporation of 10·69 pounds of water, from a temperature of 212°, and, for the three varieties of bituminous combustible, the corresponding effect was 10·84 pounds. The results are practically identical. By throwing out of the comparison some of the varieties of anthracite, which justly have a poor reputation in the market, the preponderance would be upon the other side. If, then, we take it for granted that the average foreign and American and bituminous coals are substantially equal in value, the value of the combustible of the foreign coal will equal that of American bituminous and American anthracite, and we may assume that the combustible of the coal, burned in any case, is a tolerably accurate comparative measure of the economy of a steam engine. All these restrictive qualifications are necessary, for, if selected coal of the best quality, be used in a trial, the results will be above the average in any case. We wish simply to indicate that the greatest difference in the results given by different coals is due to the difference in the quantity of non-combustible matter, so that, if this be thrown out, the weight of the combustible remaining gives the nearest approach possible, without absolute trial, to the comparative heat-producing powers of different specimens. The best standard to show the comparative economy of the steam engine, other than that of the steam used, is therefore "The number of pounds of combustible used per horse power per hour."

We cannot fairly, however, compare the combustible per horse power per hour, used in experiments here, with other experiments when only the coal was noted. This necessitates us to correct the amount of coal used by a common standard, founded on the combustible. Good bituminous coals, here and in England, leave about 10 per cent refuse; hence, to make our experiments compare with those abroad, as well as for convenience, we suggest that in every case, the coal burned in determining the economy of a steam engine be reduced to a common standard of 10 per cent refuse. Let us see the effect of this. The true comparative test for engines is the amount of heat they receive; we have shown that the heat-producing power of the coal is proportioned to the weight of the combustible; hence, if the weight of the coal be also proportioned to that of the combustible, it also expresses the relative economy. The coal is so proportioned when it leaves the same percentage of refuse, so by our plan of correcting the weight of the coal by its combustible, so as to give 10 per cent refuse in each case, the weight of the coal is a true comparative test of the relative economy of the engine. For instance, 100 pounds of coal leaving 20 per cent refuse will evaporate no more water that 88·9 pounds leaving 10 per cent refuse, for both contain only 80 pounds of combustible. If to the combustible we add one ninth of its weight, the quantity added is one tenth, or 10 per cent of the sum, which represents the weight of the coal, corrected to the uniform standard of 10 per cent refuse. Suppose a horse power in a certain foreign steamship costs 2·8 pounds of bituminous coal per hour, and in an American vessel it costs 3 pounds of coal, using anthracite, are we to say our engines are inferior? Let us see. We first deduct the refuse from the anthracite—for instance, 20 per cent, which leaves 2·4 pounds of combustible. This, then, is nine tenths of the weight of coal having ten per cent of refuse; so multiply 2·4 by $\frac{10}{9}$, gives 2·67 pounds as the true cost of the power in the American engine, to compare with 2 8 pounds used by the foreigner, when both are compared by the same standard.

We have been thus explicit because the fuel is so generally used in the comparison of the performance of steam engines. The coal bills of course show the absolute cost of the power in any particular case, no matter what quality of coal was used; but, under such circumstances, the weight of coal consumed, even when corrected as above pointed out, is, as must be seen, but an imperfect comparative measure. To make comparisons sufficiently correct to answer the demands of science, we must measure the steam used in each case—in other words, compare engines by the Number of Pounds of Steam used per Horse Power per Hour.

The calculations are usually made from the pressure shown at the termination of the stroke; the assumption being that the engine uses, at every stroke, one full cylinder of steam at that pressure. In other cases, however, the initial pressure, and the portion of the cylinder filled at the point of cut off, are used in the calculation. These methods of determination pre-suppose that dry or saturated steam enters the cylinder, which may be true, and that the steam continues in this state, through at least part of the stroke, without condensation, which is never the case. Steam is necessarily condensed to set free the heat transmuted into the work done; and the temperature of the metal of the cylinder is a mean of the temperature to which it is subjected, and therefore forms a condenser with respect to the initial steam. The consequence is, that there is always more steam taken from the boiler than is shown by the indicator; the discrepancy increasing with the degree of expansion and amount of external refrigeration. Clarke, in his work on the locomotive, points out great differences between the amount of steam calculated from the initial and terminal pressures shown by the indicator; and yet uses the first in all his calculations. Later experiments, where the steam has been actually measured, show that in small engines twenty to thirty per cent of the steam is unaccounted for by the indicator at full stroke; and as high as sixty to eighty per cent when the steam is expanded considerably. Large engines show a small discrepancy at full stroke, which rises to thirty, and often fifty per cent, with shorter admissions. The best examples of the English double cylinder pumping engines use thirty-three per cent more steam than is shown by the indicator or the cylinders. This method of determination is therefore absolutely worthless for our purpose, as it furnishes no basis for reliable comparative tests. To these discrepancies must be attributed the losses which are known to arise in the steam engine. They have been ascertained, in practice, by indicating the engine and measuring the water pumped into the boiler, and evaporated there, to furnish steam. In other cases, the exhaust steam of the engine has, by surface condensation, been reduced to water, and its quantity determined by measuring or weighing it. The weight of feed water, or, what is the same thing, of steam used in any case, to produce a given power, may, by either of these plans, be ascertained with scrupulous accuracy; and if the coal be weighed at the same time, the evaporative efficiency of the boiler can also be determined, and the excellence of both engine and boiler be detected and credited aright.

In addition to the standards above given, expressing the economy of the engine, others of special application are used, which give the cost in terms of that which costs money every day; namely, the coal, and the result in that which returns the money. For instance, the miller speaks of the number of pounds of coal it requires to grind a barrel of flour—a thing, by the way, which may depend as much upon the condition of the mill as of the steam machinery. Locomotives are rated by the number of pounds of coal or coke burned per tun, per mile. So, also, what is known as the "duty" of a pumping engine, is the number of foot pounds of work derived from the consumption of a certain quantity of coal.

Having discussed the various measures and means that may be employed for our purpose, we desire next to select such as will be useful in particular cases, and show their practical application, which leads us to

THE METHOD OF CONDUCTING EXPERIMENTS.—I. TESTING BOILERS.

The power of an engine can never exceed that of the boiler which furnishes it with steam; hence, it is eminently proper that we should first select measures to ascertain, in a given instance, whether the steam is economically generated. As has been said, the heat producing power, or evaporating efficiency of a boiler, is measured by the number of pounds of water evaporated per pound of coal from a given temperature, say 212° Fah. We have therefore to weigh the water evaporated, and the coal producing the evaporation—a very simple thing apparently, but one about which there is much misapprehension, resulting in statements grossly erroneous and ridiculous. The water may be measured in a tank or barrel, the contents of which have been ascertained by careful measurement, or by weighing water into it of a given temperature. When experimenting, the water in the tank should be pumped out dry if possible, or at least to a given mark; the pump then stopped, the tank re-filled to the proper hight (the easiest way is to overflow it), when the supply can be shut off and the operation repeated. The supply pipe should be arranged so that the water can be seen entering the tank, and leakage detected while the pump is working. The better way is to have a hose to throw in and out of the measuring tank. Before making even experiment, it should be ascertained if the boiler foams or raises water; if so, it must be remedied before proceeding farther. All leaks about the tank, pump, and boiler, should be stopped; and all extra pipes leading water in or out of the boiler be disconnected, or frequently examined. The steam generator may be worked off in the engine, blown off through the safety valve, or otherwise disposed of, so long as no water is lifted with it. The latter is less liable to happen when the evaporation takes place under considerable pressure. The greatest care is necessary in commencing and ending experiments. There are two methods of doing this. The first is to measure the temperature and hight of the water in the boiler, and, immediately upon starting the fire, to keep an account of the fuel consumed, until the close of the experiment; then to weigh the coal and ashes hauled out of the furnace. This involves a calculation to ascertain the heating effect of the fuel used in generating steam. It is of little value for the purpose of comparison, for the shell of the boiler and its surroundings (often a heavy mass of brick work) has also to be heated; and of this no estimate can be formed. The better plan is to get every thing in average working condition before starting the experiment. The steam should have the proper pressure, the fire be clean, and of a certain thickness, judging by marks on the sides of the furnace, the ash pit clean, and the water at a certain known hight. The experiment may then proceed, weighing all the coal afterward used, and measuring the water pumped into the boiler, till near the desired time to stop, when the fire should be thoroughly cleaned and filled up with coal to the same marks as at the beginning; and should be maintained at that point, with the steam at the starting pressure, till after pumping in the last tank of water, when, as soon as the water level reaches the same hight as at starting, the experiment may be terminated. The ashes in the pit should then be weighed, as well as those previously collected. The fire should be equally bright, and the steam pressure the same at the beginning and end of the experiment, so that the water level will be disturbed in like manner. At stopping or starting a certain feed should be kept on; or the water should be pumped too high, and time noted when, by evaporation, the level falls to the mark. No experiment should be less than eight hours in length; and a trial of forty-eight to seventy-two hours' duration can better be depended upon. During the experiment a log should be kept, upon which should be recorded the time, the weight of the coal and ashes, the number of tanks of feed water, and the temperature of each. The temperature of the escaping products of combustion, and of the fire room, may also be noted; as well as any evident remarks about the kind of coal, and the circumstances of the trial. After the experiment, the following calculations are necessary: First, in an evident manner, ascertain the total amount of coal and ashes, subtract one from the other, which gives the total weight of the combustible. Then find the average temperature of the feed water, and the average pressure of steam. Then calculate the weight of the whole quantity of water evaporated, making allowance for its temperature.

(To be continued.)

Correspondence.

The Editors are not responsible for the opinions expressed by their correspondents.

Steam Engine Indicator.

MESSRS. EDITORS:—I have read with surprise the criticisms on the indicator as a means of ascertaining the power exerted by steam engines, contained in the paper by Mr. Emery, published in your last two numbers. The writer says that its indications have been shown to be of a most unreliable and deceitful character, even in those respects in which they had heretofore been considered practically perfect; and that although the Richards Indicator is undoubtedly a great improvement upon the old style, still the best of these instruments give, at fifty revolutions of an engine per minute, when cutting off at an early point of the stroke, diagrams which have been demonstrated to be erroneous by from ten to twenty-five per cent. He describes an experiment by which he states that any one may prove the existence of these errors, and then attempts to show that they are unavoidable.

The connection leaves it to be inferred that this startling discovery has been made in the course of the experiments on steam expansion, which have for several years been carried on by the Navy Department. This show of authority, together with the candor and evident sincerity of the writer, is likely to carry some weight; and the charge might, if permitted to pass unchallenged, be regarded by many as confessed.

Now, nothing can be more certain than that the defects here attributed to the indicator have no existence. The action of this instrument has been investigated too thoroughly, by too many able engineers, and under too many varied conditions, to permit confidence in it to be shaken by any statements inconsistent with the general experience. I cordially unite in recommending experiments of the character suggested by Mr. Emery to be generally made; and whenever these are properly conducted, it will be found that all the diagrams taken from an engine when exerting the same power, however they may differ in their outlines, instead of presenting the discrepancies stated, will contain the same area exactly.

Mr. Emery accounts for these imagined errors by supposing that the inertia of the moving parts of the instrument compels the indications to be tardy. Let it be assumed that such tardiness of action exists, in a degree sufficient to account for the least amount of error stated; namely, ten per cent at fifty revolutions of the engine per minute. Then, if the speed of the engine is increased, this error also must increase in the same ratio in which the power required to overcome the inertia of the moving parts increases; or as the square of the speed, and at four hundred revolutions of the engine per minute will amount to six hundred and forty per cent, and we find ourselves far beyond the limit of speed at which the indicator can give any diagram at all. But I have taken diagrams with the Richards indicator at four hundred revolutions and over per minute, which were demonstrably perfect, although the entire figure was completed in less than the one seventh part of a second. I have also taken diagrams from locomotive cylinders at two hundred and sixty revolutions per minute, in which the admission line was carried by the momentum of the moving parts, much above the point which

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would mark the pressure of the steam; and the reaction of the spring was so instantaneous that the pencil descended on the same line. To those who are familiar with the action of this instrument at high speeds, the idea of its being tardy appears quite absurd; and they will unite in assuring our critic that he must look elsewhere for the causes of the discrepancies which he imagines he has discovered.

Thanking you for your courtesy in permitting me to trespass so much on your valuable space, I am yours,

New York, Nov. 20, 1868. CHARLES T. PORTER.

Testing the Power of Steam Engines.

MESSRS. EDITORS:—I notice in No. 21, page 322, the following from the pen of "C. E. Emery, late of the U. S. Navy and U. S. Steam Expansion Experiments:"

"The measurement of the power in the steam cylinder by the indicator is defective, also, because it takes no account of the friction of the engine."

Will Mr. Emery please state what we shall call the result we get by the indicator when we throw off all resistance and run the engine by itself alone? ENGINEER.

Curiosities of Vision.

MESSRS. EDITORS.—In a recent number of your paper I notice an article on a subject which has often occupied my thoughts, that is, the difference in the real appreciation of the magnitude of the same objects by different persons. We know that the vision of all persons is affected by their idea of the distance of the object viewed in relation to its magnitnde, and that correct ideas of magnitude gathered simply from vision are impossible.

The painter when he represents an object, a landscape, or an architectural structure, always places somewhere in the field of view, some well known object, with the proper size of which, all are acquainted, and which object is really the scale by which the dimension of the picture is to be estimated. But even in real objects there is great liability of mistake. It is said that to a stranger not accustomed to the sight, a large man standing in the door of St. Paul's, London, looks like a boy, and that it is necessary for a person to become familiar with the great cathedrals of Europe, and time and again compare them with well known things that have been handled before they can fully appreciate their majestic proportions.

But the question has occurred to me: Is there not a real difference in the appreciation of two persons in relation to the magnitude of the same object even when it can be handled; and is not this the real reason why one person will go into extacies at a view of Niagara, or of Barnum's fat woman, while another will only, like the tailor, see "a glorious place to sponge a coat," or a lump of disgusting humanity? From what I have seen, read, and experienced, I believe that such a difference does exist, and that it is the main spring of what has been called taste by some, in relation to an appreciation of the sublime.

We may read a description of Niagara written by one of these large viewers and our mental vision, may be enlarged by his or her descriptive figures till our ideas may come up almost to the glowing picture painted, and the "Tremendous Current" of our school-boy days be really worth more than the money it would cost to go and see it, but alas for the disenchantment, if perchance we do get to see the original especially after roaming the broad prairies and crossing the wide rivers of the West.

Under such circumstances I must confess my first thought was when I looked on the "insatiable abyss:" Is that all? and I passed on my way, not waiting for it to "grow" on me. But I believe I am not totally devoid of the faculty (or whatever else the phrenologists call it) of sublimity. I can look at the moon on a cloudless night, and by an exercise of will, or imagination, or of reason or arithmetic, I know not which, I can make it appear to my "mind's eye" as large as it should appear if some twenty thousand miles distant. The same experiment is successful with many other objects which can be excluded from other objects in the field of vision.

I recollect that one time when out hunting in a snowy winter on the prairie I saw across a shallow valley, at as I supposed a half mile distance, a "tremendous varmint," smelling around on the sun-lit snow. After screwing up my courage for a few moments, I cautiously advanced, and after a few rods walk, succeeded in slaying one of these little mephitic quadrupeds, which so strongly excited the disgust of old Carver when he traveled here a hundred years ago, and which some call skunk. I would have bet at least on a black wolf or anything larger if we had such, until I had taken a few steps toward him. At another time I got a view of one of the most tremendous structures for a few moments ever seen or made by man. A steamboat had landed against a small island in the Mississippi, covered with low trees, upon the other side of which I happened to be. Beyond, on the other side of the river was a clean prairie horizon which could just be seen above the trees. I saw nothing of the boat but her two chimneys, and at first sight, and indeed until reason had time to prove the contrary, they seemed to me to be two immense towers, at least a thousand feet high, resting on the distant landscape. By imagination, I suppose, I repeated this effect several times, until I really began to feel quite "sublime." Capt. Parry tells us how he used to see on the great snow wastes of the North great cairns of stones, which with a few minutes walk he could pick up in his hand, and I have often seen on a prairie ridge, when traveling, an immense mansion, which in a short drive turned out to be the the 16×20 "box" of a new settler. That there is but a few steps in such cases from the sublime to the ridiculous, I have found out by experience, and that the faculties or the "tastes" of different men depend very much upon a difference in natural or perhaps acquired appreciation in sight as well as in other senses I am fully persuaded. C. BOYNTON.

Lyons, Iowa.

Meteorites—New Theory Propounded.

MESSRS. EDITORS:—Perhaps it may interest your scientific readers to know that this morning (Nov. 14th), especially after 3 o'clock, meteorites fell here and around this vicinity in great numbers—superseding anything of the kind ever heretofore seen, as many of the early-risers say. One fell after 4 o'clock, on the Gloucester ferry-slip, and exploded with a loud report resembling that of a pistol. Several were seen falling, leaving long and luminous trains behind them; and one was observed moving with great velocity in a northwestern direction, and leaving behind it a very long luminous tail. Another blazed forth in the southern heavens, and threw so clear and vivid a light around it that the whole scenery was lighted up for the time being, as it would have been by a flash of vivid lightning.

Two years ago I wrote to a certain scientific editor that the true cause of our annual or November meteoric showers was the fact that, at that period of the year, the earth actually *crosses the sun's path;* that is, the earth is direct behind the sun, and passes over his orbit on the 14th day of November of every year.

For some cause or other the editor referred to did not give my article publicity. I therefore, for the sake of astronomic science, appeal to the SCIENTIFIC AMERICAN. I think it capable of demonstration that not only does the earth actually cross the sun's path on the morning of the 14th Novembar every year without exception, but that the sun is actually moving around the heavens in westward orbital motion, and that he is positively leaving a meteoric train behind him, which stretches out many degrees beyond the earth's orbit.

These are facts of astronomical science, which ought to be carried to the ears or eyes of every scientific man, and which I hope the worthy editors of the SCIENTIFIC AMERICAN will aid me in bringing publicly before the world.

JOHN HEPBURN, SEN.

Gloucester, N. J.

Manufacture of White Lead---New Processes.

For the Scientific American.

The adulteration of white lead with sulphate of baryta has become so common that it is one of the regular steps in its preparation in all factories. The pure white lead of the most finely ground quality is called "Silver White;" when mixed with equal parts finely ground sulphate of baryta it is called, on the European continent, "Venice White." When adulterated with double its weight of sulphate of baryta it is known as "Hamburg White;" and even three parts of the baryta and more to one of lead are frequently used. This adulteration is not entirely a deterioration, and many of these adulterated qualities are preferred for certain purposes to the pure article.

There exists another kind of white lead, called "Kremner White," which owes its pure white color to the original purity of the lead employed (which is free from silver and iron), and the carefulness in the method of manufacture, clearing it from all powdered metallic lead or sulphuret, which, especially the last, even in the smallest quantities, injure many other qualities of white lead.

The method described on page 298 is usually called the Dutch process, and being very injurious to the workmen has in certain localities been superseded by the so-called French process, of which Thenard first established the principle. It consists in making a solution of a soluble salt of lead, and by passing carbonic acid gas through it the lead is precipitated as a carbonate. This process may be executed on a very small as well as on a large scale, and requires the following steps: First, a saturated solution of acetate of lead (lead sugar) is made, either by dissolving this salt in water, or by heating metallic lead with pure vinegar; this solution is boiled with oxide of lead (litharge) till it cannot dissolve any more of it; one part of pure strong wood vinegar (pyroligneous acid) will dissolve a little less than one part of litharge (oxide of lead) and form a neutral acetate, when dissolving twice that quantity of litharge in it (correctly 60 parts of acetic acid to 112 of litharge, one atom of each) we obtain a so-called subacetate, a basic solution, which colors litmus paper blue, and when dissolving three times the amount of litharge the solution is saturated, and the excess of lead above the neutral solution will be readily precipitated as carbonate of lead by passing carbonic acid gas through the solution, till the solution becomes neutral again, or even acid.

This carbonic acid gas may be obtained by the action of sulphuric acid and water on chalk or marble, as is done in the preparation of the so-called soda water, or it may be obtained from the combustion of charcoal, but in this case it must be purified, chiefly from sulphur vapors, as these color lead black, and consequently make the precipitate very dirty looking. The best way is to pass the gas resulting from combustion first through a separate solution of lead, before passing it into the receptacle from which the white lead is to be precipitated. As soon as this precipitation is completed the liquid is left to settle, the supernatant neutral acetate of lead solution is decanted off, and boiled with another dose of litharge; thus a limited amount of acetate could be used for an indefinite period, if there were not unavoidable losses during the process, which have to be supplied from time to time with fresh acetic acid. It is clear that during this method of operation, the white lead being obtained from the first in a wet condition, the workmen are not exposed to the poisonous dust, as is the case in the old process described on page 298.

Several modifications of this French process have been proposed; for instance, Button and Dyer make a solution of litharge in nitric acid, and precipitate with carbonic acid obtained from the combustion of coke. Richardson uses sulphuric acid to precipitate the solution of acetate of lead, and thus forms not a carbonate but a sulphate of lead; and Leigh precipitates a carbonate from a solution of the chloride of the metal by means of carbonate of ammonia, which is only a more expensive way of operating without compensating benefit. Pattinson has a similar method, but precipitates the white lead by means of a solution of carbonate of magnesia in carbonic acid water, which solution he obtains from the mineral hydrate of magnesia, or from magnesia limestone; the solution he uses contains chloride of lead, and he treats the precipitate with caustic potash or soda, and he asserts that in this way his white lead becomes equal to the best known.

A method was recently patented in England and the United States to simply use an impure ore of lead of such a kind as is soluble in acetic acid, boil it with the acid, decant and filter the solution till clear, and then precipitate with carbonic acid. A common lead ore of this class is a mineral carbonate of lead of a reddish brown or gray color, it is abundantly found in England, but when introducing this method in the United States a great drawback was found to consist in the fact that not such a lead ore had been found here. Fortunately railroad cuttings in Missouri quite recently brought to light large deposits of this mineral, which are now being used for the manufacture of lead, white lead, and other lead compounds.

Dr. Vander Weyde, of New York, recently patented an apparatus by which the wood vinegar necessary for the solution of this ore, could be distilled from the wood at the mine, and the residue of the distillation, the charcoal, while hot in the still, was converted into carbonic acid gas, by simply blowing a current of air through the still, as soon as the volatile products were driven off by the distillation; this carbonic acid gas, after passing through cooling and washing tubs, is used for the precipitation of the carbonate of lead, the whole process thus being accomplished in one apparatus and one operation.

By this process of using the lead ore, the labor of reduction to the metallic state is entirely saved, a labor required when following either the old or so-called Dutch method, or when using the lead sugar, or when dissolving in acetic acid the litharge which is manufactured from the metallic lead.

Generally the white lead obtained after the French method by precipitation, has not the body, or else does not cover so well as that prepared after the old Dutch method; the cause is revealed by the microscope; the precipitated white lead consists of little semi-translucent crystals—the Dutch white lead—out of opaque white grains, but later improvements in the French method have overcome that difficulty to a great degree; they consist in preventing the formation of these small crystals by the use of nitric, sulphuric, and hydrochloric acids, and thus form a compound which consists not only chiefly of a carbonate, but also of a sulphate and chloride, which last two, by themselves, are inferior to the carbonate, but when combined in the formation of the precipitate, appear to improve the pure carbonate in a manner not yet precisely explained.

Chemical analysis has proved that the pure white lead manufactured after the Dutch process, is a compound of two atoms of carbonate of lead and one atom of hydrated oxide of lead, therefore is it probable that when the carbonate of lead obtained by precipitation after the French process was boiled with a sufficient quantity of a pure solution of subacetate of lead, it would take from this solution some hydrated oxide of lead, and become also a compound of carbonate and hydrated oxide of lead, and be as opaque, and dense of body as the Kremner white. A hint worth trying.

Of course the white lead manufactured after the French method is also adulterated with sulphate of baryta in different proportions, and this will be the case till a method is found of making pure white lead directly from the ore, and as cheap as the baryta, in which case the adulteration would not pay any more and come to an end. V.

The Defects of Railway Tracks.

Standing by the side of the line when the engine is slowly passing, says the *American Railway Times*, and watching the effect of the wheels, it will soon be detected why the annual repair and reconstruction expenses are so large. As each driving wheel passes over the cross-tie, the tie is driven down in the ballast just in proportion as the bearing surface is deficient to sustain the load. Now where the cross-ties are irregular in size, the resisting power to depression varies, the smaller tie sinking deepest, the blow from the driving wheel being aided by the fall so that the effects are aggravated in proportion. This result leaves the track a succession of short and irregular waves of the chop-sea variety, and not the condition for smooth running, or favorable to the "life" of any portion of the track or rolling stock. No amount of tamping up can prevent the formation of these depressions in the track where the cross-ties are irregular in size, and consequently there is an unequal amount of bearing surface. How many of the track-men, or in fact, how many of the managers ever give any heed to this matter or suppose it of any importance? Not many we fear. on many lines can be seen, lying side by side, cross-ties of every size and shape, some large and long, some small and long, short and small, some crooked. Frequently can be seen one tie extending from one to two feet outside of one rail longer than it does outside of the other, and frequently it is found that no attention is paid to the distance between the ties, and no effort is made to equalize the amount of bearing surface on the ballast per running foot or yard of track. This practice, or mal-practice, is very common, and there can be nothing more wasteful or improvident, nothing more unphilosophical. Vast amounts

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of money are expended to secure a smooth and even road-bed, for that is the theory of all railway construction, and then the practice is to so arrange the super-structure that the evenness and smoothness are at once destroyed, and the trains instead of having that easy gliding motion so favorable to economy of operation and safety, go thumping and pounding over the line, causing a useless waste of power, destroying the road-bed, and every part of the superstructure, and destroying every part of the rolling stock as well. Railway managers, most of them at least, can see this state of things on their own lines, any day they may take the trouble to examine them; and knowing as they do, for so they say in their reports, that the smooth track is favorable to economy of operation, they yet permit their road-masters and track-men to violate, in a hundred different ways, every principle of common sense and good railway practice that goes to secure this smoothness and evenness of track. The deficiency in this matter we believe is greater now than it was a dozen years since, but it is certainly safe to say that no improvement has been made during the time except in isolated cases. It is common enough to berate the rail manufacturers for failure to produce a serviceable article, but the cause of the early destruction of rails is, we fear, not always the quality of the make, it is in some degree due to the treatment they receive in the track. With the increased weight upon driving wheels and more frequent trains, and the condition of the tracks, with all the disturbing and destructive elements in them to which we have alluded, it is not a matter of wonder that iron rails wear out at an early day, and it is simply absurd to expect any other result. We do not hesitate to say, that unless the railway managers reform the character of the superstructure, arranging its details so as to secure that amount of evenness and smoothness which is practicable even under the present insufficient system, our sympathies will be with the rail makers, and not with the railway managers. In the different details of the superstructure, such as chairs, wood and iron splices, and other joint fastenings, there are some methods which are better than others, but we shall not attempt to sit in judgement upon them at present, and perhaps it is needless that anyone should do so; but one thing the railway manager must be certain of, and that is, that the best results of any system of rail fastening cannot be secured until the rails have equal, continuous, and permanent bearing, so that they may be kept truly in plane and line, and not liable to become disarranged by every passing train. The bearing surface of cross-ties is little enough on all the lines, but what there is should be evenly distributed under the rails. If the road-masters or managers think undue stress is laid upon this matter, they are simply very much mistaken.

Rapid Railroad Building.

The two departments of the great trans-continental railroad seem to grow fully as rapidly as the Ohio pumpkin vine, which the farmer advised the traveler to bestride as being a better means of travel than his jaded nag. As regards the eastern branch, we know that although to-day the newspapers state its working terminus at so many hundred miles west of Omaha, before we can comprehend the fact the report comes that it has added fifty or a hundred miles to its length. It seems to be the same on the other side, if we may credit the San Francisco *Bulletin*, which says:

"A few days since a merchant came down to the city from the eastern side of the Sierra Nevada. Having bought an extensive assortment of goods he gave directions that they should be shipped to the end of the Central Pacific Railroad, wherever that should be, expecting to have a considerable job of teaming to fill up the gap between the working end of the road and his place of business. His directions were obeyed to the letter. But, to his astonishment, on returning he found that the goods ordered had been carried about fifteen miles beyond his residence.

"The Continental Railroad is now 'on its travels.' It is not safe to limit its progress. There are probably twenty thousand days of work performed on every secular day. If a merchant sends goods to the end of the road, they will bring bring up somewhere this side of Salt Lake city, possibly in some ambitious little town that he never heard of before his departure. Miles of road are created, and even towns, in a single day. The dot on the map showing the working terminus of the road at the beginning of the week, must be moved forward at the end of the week to a point representing from eighteen to twenty miles of progress. Only a few months will elapse before a general direction to send goods to the end of the road will insure their bringing up either at Omaha or New York. It might be a safer plan just now for the interior merchant to drive a stake before leaving home, and order his goods not to be sent beyond the stake, lest he should have to chase them into the wilderness."

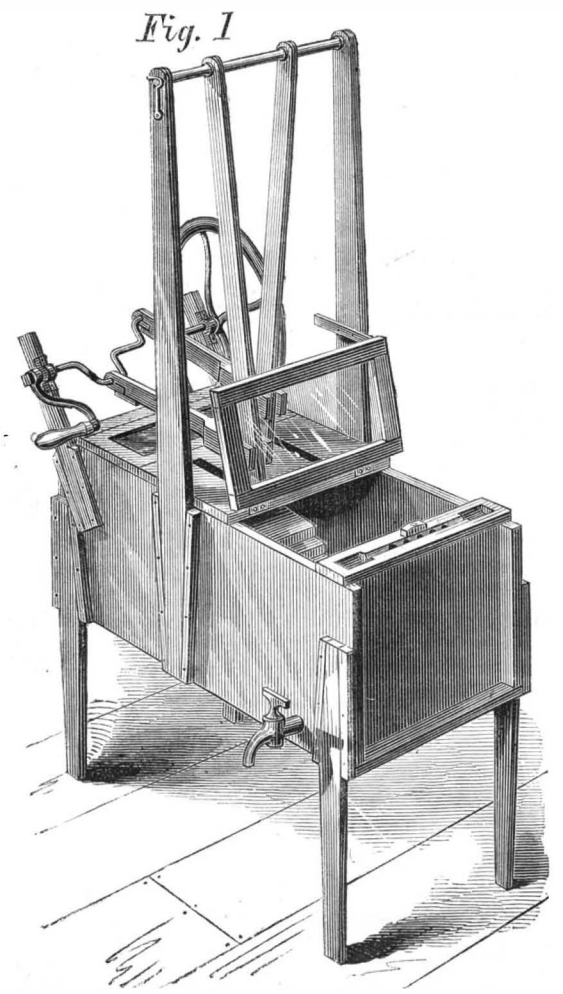
Mead's Monument of Lincoln.

A monument to the memory of Abraham Lincoln is to be erected at Springfield, Ill., at an expense of $200,000, of which sum $135,000 are already secured. Thirty-two designs were offered to the committee, and the decision was given in favor of the one made by Larkin G. Mead, of Vermont, and whose studio is at Florence, where, by patient industry and a refined genius, he has achieved a deserved fame. We had the pleasure of seeing the artist's drawing in perspective, and were favorably impressed by it. The whole hight is to be one hundred feet, and with the exception of its bronze figures, the monument will be of New England granite. Mr. Mead is making immediate arrangements for all preliminary work upon the monument, and will leave for Italy in about two months, to begin his models for the figures necessary. He thinks it will be about four years before the entire monument will be completed. His contract provides that the foundation must be completed during the summer and autumn of next year, 1869; the entire granite work is to be finished by Jan. 1, 1873. The artist will be allowed four years after that date for the completion of the sculpture.

SELFRIDGE'S PATENT WASHING MACHINE.

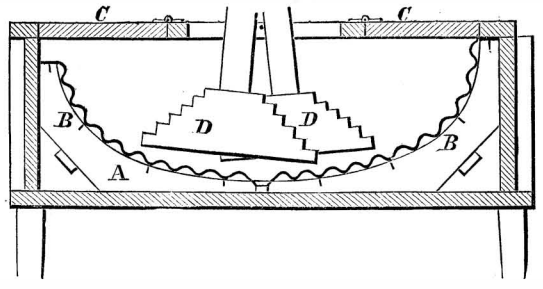
Inventions for lessening the household labor of women do not seem to meet with so great a success as those improvements on machines of which men have the sole charge. The sewing machine is an exception, but it is notable that the

Fig. 1



fact thus stated is evident. Whether the genius of women does not affect mechanics, or that the apparent complication of the devices contrived for women's convenience frightens them from a thorough trial of them may be an open question; but it is certain that the simpler the form and the easier the manipulation of a machine intended for the use of the gentler sex, the better chance it has for success. Apparently acting on this belief, the inventor of the machine of which the accompanying engravings are representations, has contrived a washing machine that is compact, portable, easily cleaned and worked, and very simple. Its form and general appearance is seen in Fig. 1, and the internal construction is seen in the section, Fig. 2. The tank, A, holds a washboard, B, which is in two parts, semi-elliptical and corrugated. These parts can be removed for cleaning by opening the hinged lids, C, which may be glassed, as seen in Fig. 1, to allow of a view of the interior as the work progresses.

Fig. 2



Two plunger or rubbers, D, having corrugated inclined sides, are suspended by pendulum arms to an elevated shaft held in uprights at the center of the machine, the arms being operated by means of hooked connecting bars, driven by cranks set isochronously on a shaft at one end of the machine turned by a handle. As one plunger moves forward the other is returning and a continuous rubbing of the clothes is assured. A faucet is inserted at or near one end of the tank for drawing off the dirty water. All the parts are so arranged that they may be separated for convenience in storing or removing. The recommendations from those who have used it are numerous and very favorable.

Patented through the Scientific American Patent Agency Nov. 5, 1867, by G. C. Selfridge, whom address for additional particulars at Saratoga Springs, N. Y. State rights for sale.

Sharpening Saws.—A correspondent informs us that, in answer to an advertisement, he paid fifty cents for the accompanying information: "After filing your saw, lay it on a level board and pass over the side of the teeth with a whetstone until all the wire edge is off the teeth. This will make your saw cut true and smooth, and remain sharp longer. Your saw must be set true with a sawset."

CULTIVATION OF WASTE LANDS ON RAILWAY LINES.

Nothing is more noticeable to the observant traveler on our railroads than the contrast between the land inclosed by the fences confining the road, and that on either side belonging to adjoining farms. Where the latter are cultivated, yielding crops of grass, grain, or vegetables, the former are either gravelly cuttings, scored by rain floods, plats of level denuded of their soil to be used for fillings on the line, or stretches of arable soil, left to grow up to weeds and wildness, detrimental to the adjoining properties and useless to anybody. Occasionally a patch of cabbages or potatoes, in the vicinity of a station or the dwelling of a switch tender, shows what industry can do in utilizing these waste spots. Such oases in the desert of the railroad line prove that "what has been done may be done." There can be no reason why the unimproved lands on the lines might not, in many instances, be cultivated, with a three-fold object, not the least of which would be the gratification of the eye accorded to the passengers. Another would be the additional income afforded to shareholders of the road, or the additional comforts to their employés. Still another advantage would be preservation of the embankments and cuttings from the effects of heavy rains or local floods or freshets, which, in one case, wash away the material of the road, rendering the ties insecure, and in the other deposit upon the track an excess of ballast.

Where an embankment or causeway has been carried across a low-lying "meadow," to equalize the level of the line, the perpetual moisture, aided by numerous trickling rills and running streams, gradually undermine the embankment and cause tumbles or slides, endangering the safety of passing trains and the permanency of the roadway. In such cases these embankments may be preserved by planting the slopes, however steep, with the osier. Wherever there is sufficient moisture, this species of the willow will grow. The kinds most adapted to our northern climate are the *Salix Viminalis* and the *Salix Forbyana*, both very valuable for basket making and other textile fabrics of wood. But beside this value as a material for manufacture, the long tendrils of the main root pierce the soil, on which they are subsisting, horizontally, binding the material of the embankment or dike into a solid mass; while the stocks, or the growing osier, present a barrier to the action of temporary floods and heavy rains. A notable instance of the value of this plant may be seen in the condition of the extensive dikes built in Hartford, Conn., by the late Col. Colt, where hundreds of acres of splendid arable soil has been preserved from annual overflow, and lands, before almost useless, have been turned into fertile fields or covered with villages, the inhabitants of which are supported by the great pistol factory, the manufactory of willow ware—the material for which is drawn annually and wholly from the products of the sides of the dike—and one or more sawing and planing mills.

There can be no valid reason why such embankments on the lines of our railroads may not be similarly utilized. After planting the osiers—which is done simply by slips—no other care is necessary. In the fall the shoots may be cut by a pruning knife, and can be sold as basket stuff, while the roots and stock remain to defend the embankment and furnish another crop the coming year.

But there are also slopes caused by cuttings, in localties where their bases—not like embankments—do not reach perpetual moisture. Few of them are of such an angle that grasses and grains may not be grown upon them. At least they will support the masses which will tend to preserve the integrity of the slope, and, in time, prevent its wearing away except when destroyed by a violent rain storm. Grass and grain seed scattered over these slopes, however gravelly and denuded of true soil they may appear to be, will take root and bear, and clots of grass sod, and of moss, will readily adapt themselves to their new conditions, so that even if *they* should not flourish, they will form a holding place for more useful plants.

On the level of the lines, frequently, large areas are fenced in, which belong to the railroad, that have been used either as deposits from which earth has been drawn to make embankments, or from which the trees have been cut for ties for the road, stringers or braces for bridges, or culverts or for other purposes. Although in many of these places the soil has been removed so that the clean gravel is exposed, in many others the surface is undisturbed except by the removal of the superincumbent growth of trees and brushwood, leaving the soil in tolerable condition for the plow or the spade. These spots might be cultivated by adjacent proprietors, or by the section men when the localities are removed any considerable distance from a village or farm house. The aggregate yield of useful or marketable commodities on a line of say twenty miles would amount to something of value either to the cultivator or owner, whoever the latter may be, and the appearance as well as the value of the road be greatly advantaged The subject is worth attention.

These matters are better managed in the old countries. There the station houses frequently are flanked on either side by beds of vegetables and parterres of flowers, protected by fences from the public way and the railway lines. Each one of these little stopping places are pleasant homes, attached to which are beautiful gardens bearing evidences of thrift and patient industry, forming pleasant views for the passengers of passing trains. What can prevent a similar condition on our railway lines?

It is proposed to illuminate the great cross upon the Pittsburgh Cathedral with gas lights, to be ignited by electricity.

Hard steel and dry grindstones reduce the temper of the one and injure the usefulness of the other.

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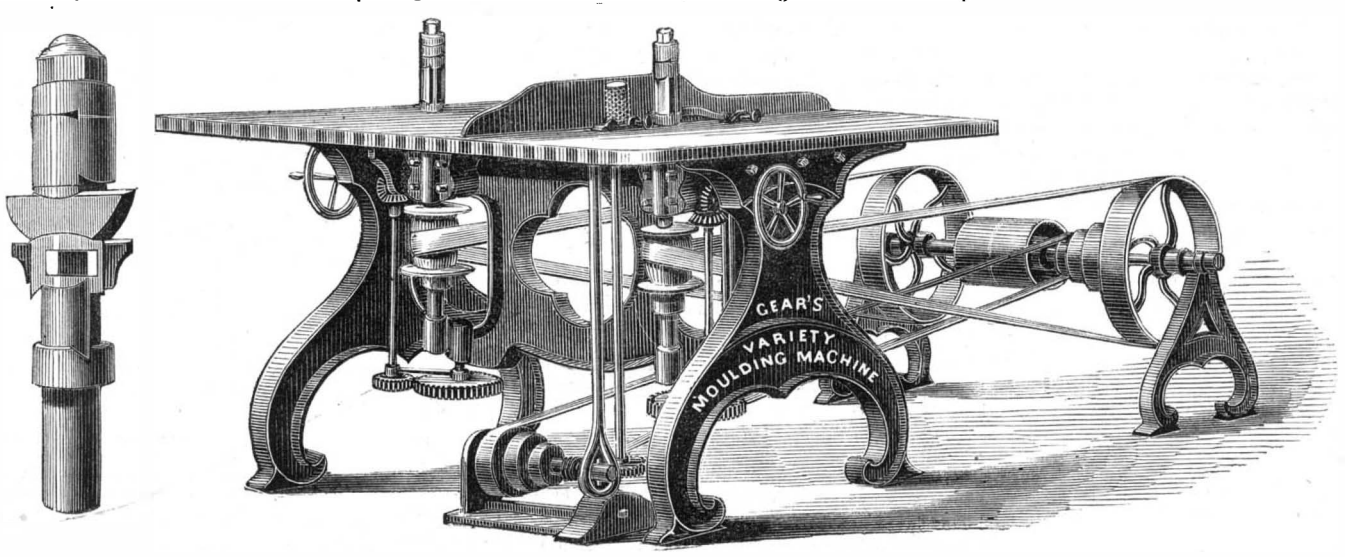
Improvement in Wood-working Machinery.

Among the many noticeable articles exhibited at the Crystal Palace in this city was a curious and ingenious contrivance for cutting irregular forms in wood—the need of which had been long and seriously felt, and which has since completely revolutionized the manufacture of furniture—the invention of Mr. Nathaniel Gear. A broad table, say four feet square, rested upon an iron frame, at the usual hight of a carpenter's bench, and rising from the surface near one end were the heads of two vertical spindles, or shafts, which projected but a few inches and constituted the most important part of the machinery; in fact, the very principle of the invention.

The peculiar construction of the heads, into which were placed sharp knives similar to common planing irons grooved and formed to suit the various styles of work desired, could not be more simple or efficient. The whole strength of the cutters being available and not impaired by holes or strained by wedges as is generally the case in holding all other cutters. The material to be planed was held upon a pattern of the form desired, by a few metallic points, and the pattern being carried past and against the heads while rotating, the material upon it was planed and molded to the shape of the pattern and knives used. Two heads were used in order to work the grain of the wood and thus impart a beauty of finish that could not be otherwise obtained.



GEAR'S VARIETY PLANING AND MOLDING MACHINE.

The engraving accompanying represents this same machine in its improved state, the result of some fifteen years experience in building and perfecting it, and while it has been essentially improved in build, it is worthy of note that the principle of the machine, the manner of holding the cutters and using the heads as a gage or guide to the pattern conveying the material to be dressed, has never been changed. By the graduation of the knives, the machine may be adapted to work of any size, making the heads even from one-half of an inch, to four inches in diameter; so that the machine may be used in doing the most delicate irregular wood work.

It is now used in planing the wood handles to hair brushes, and also in dressing plow beams and the knees of ships.

The engraving represents upon the table top of the machine, a guide, connected with which is a feed roll, which receives power to move it from the pulleys beneath the table, and when attached completes the machine for doing straight as well as irregular work.

By the hand wheel arrangement represented at each side of the machine, the spindles are raised or lowered as occasion requires, adapting the cutters to the thickness of the material operated upon.

The cutter head at the left of the machine (on Fig. 2) represents the head with several cutters; the additional and extra cutters being held in a simple manner by an *adjustable* intermediate collar, the invention of Mr. I. P. Tice.

The machine weighs about thirteen hundred pounds, and is valuable for furniture, carriage, sash, door, and blind makers, and any establishment working wood by machinery. Patented Nov. 8, 1853, and extended Sept, 30, 1867.

For information concerning D. Jordan's Patent Guards by which the shavings are gaged the same as in common planes (a valuable improvement to the machine), and all further particulars concerning the same, address the owners and manufacturers, A. S. & J. Gear & Company, New Haven, Conn., and Concord, N H.

Fungoid Diseases in Mangels and Other Plants.

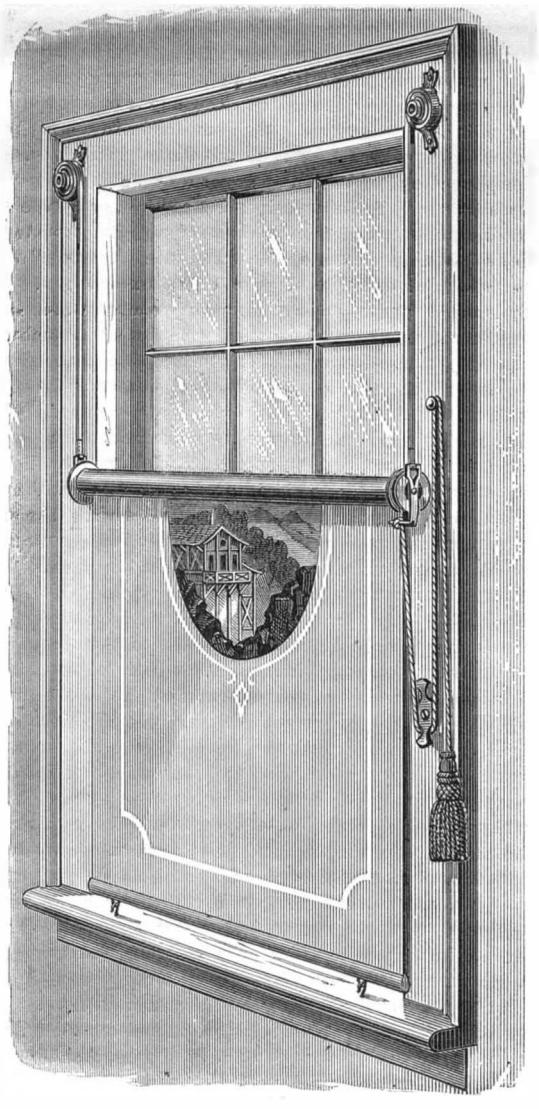
An agricultural paper contains the following on the subject of fungoid diseases in plants, called forth by the receipt of a leaf of mangel wurzel, infested with a brown parasitic fungus, with a request, first, to send name, nature, and probable cause of the disease; and, secondly, to state whether it is likely to be injurious to cattle which feed upon the leaves. It says:

"The first question is easily answered; the production in question is a fungus, its name Uredo Betæ, Persoon (Trichobasis Betæ, Léveillé), and the cause, like that of other vegetables, infection by means of its reproductive organs. The precise conditions of climate which favor the production of these parasites is not very well known; but as far as our experience goes, nothing is so likely to promote their growth as damp succeeding drought. The parasite grows on other species of beet, and when produced on very dark colored foliage acquires a deep tinge.

"The second question, which is certainly a very important one, is not so easy to answer. The matter has at present been studied very imperfectly. When these parasites are abundant, a person walking through a grass field, or a bean crop, will occasionally come out powdered densely with the orange-colored or brown spores, and it is at last pretty certain that in such conditions plants cannot have the same nutritive powers as when they are free from taint. We know that some fungi are extremely injurious. No person, for instance, who knows what ergot is—and it is often most abundant on bents in autumnal pasture—will lead his pregnant sheep or cattle where it is prevalent. If he does, he will not very improbably find that both cows and ewes are slipping their young. But there is a further evil. A great consumption of ergot, when carried on for some time, is very likely to produce dangerous gangrene. This is known to be the case in man, whole villages having occasionally labored under an epidemic of gangrene, in consequence of eating bread made of ergoted rye. It has, moreover, been suspected that this is not the only parasite which may be injurious to our flocks and herds; we should, therefore, be inclined to withhold the affected leaves, if diseased to any extent, from the farm yard; while there is not the slightest reason to suppose that the root will attain any noxious qualities, though it may have been checked in its growth by the demands made on the foliage for the nutritive matter which ought to have been modified by the influence of the atmosphere, in order to nourish the root."

LEGG'S IMPROVEMENT IN WINDOW SHADES.

Little annoyances are the musketoes of life. Any device that reduces the annoyance, however trifling it may appear at first sight, is an absolute blessing. Such is a device for the handy and ready management of window shades, by which we may exclude the direct rays of the sun and enjoy, at the same time, the benefits of ventilation. Curtains or shades which either obstruct half the light or cannot be adjusted to cover either the lower or the upper part of the window at will, are annoying, in many cases the light of the whole surface being dimmed in order the exclude the sun's rays from a portion, only, of the window.



The engraving shows a device not only useful and handy, but elegant and tasty. With this the shade may be either raised or lowered to exclude or admit light from the top or bottom. As represented, the curtain or shade is drawn down from the top, leaving the upper portion of the window free for the admission of light or air. The shade is attached to a roller in the usual way, the roller being suspended by webbing from a coiled spring concealed in ornamental disks attached to the cornice of the window frame. To bring the top of the shade down, the bottom is attached to fixed hooks on the window sill, and the cord, wound on the grooved pulley and one end of the roller, pulled, when the shade is brought down and its position secured by the ornamental holder on the side of the window frame, which does duty as a belaying pin on shipboard. When released the roller is raised by the tension of the coiled springs, when the curtain may be raised as usual by means of the cord. Thus any portion of the window may be exposed or covered as the circumstances may demand, the cord being guided by a stirrup attached to the suspending tape, which is also a stop motion when required.

Patented through the Scientific American Patent Agency, Aug. 18, 1868, by J. D. Legg, who may be addressed for State and County rights at Long Eddy, Sullivan county, N. Y.

To Make Bread.

We extract from the *Chemical News* the following on the subject of bread-making by the celebrated chemist, Liebig: "It is a well-known fact that the products of the ordinary fermentation of bread are carbonic acid, a portion of which is retained in the dough, and, by its expansion, on the sponge being submitted to the heat of the oven, renders the bread spongy; beside this, butyric acid and also alcohol are generated at the expense of a portion of the starch contained in the flour, a loss amounting to about from 2 to 4 per cent of the flour applied for bread making. The alcohol is irretrievably lost, and its loss is estimated by Liebig to amount for Germany to 50,000,000 of liters annually, and for London (the Metropolis), at 600,000 liters. All experiments tried to collect and condense this alcohol have turned out failures. Liebig recommends the following ingredients: 50 kilogrammes of rye meal, 500 grammes of bicarbonate of soda, 2·125 kilogrammes of pure hydrochloric acid, 2 kilogrammes of common salt, and 40 liters of water; the bicarbonate of soda and the acid yield carbonic acid gas, which renders the bread light and spongy. According to Liebig, the following are the advantages of the use of this method above the old-fashioned fermentation process: 1st. Saving of time and material, since no alcohol or other by-products are formed. 2d. This bread does not readily become moldy, since, not having been mixed with yeast, it does not contain, as is otherwise always the case, the sporules of cryptogamic plants, which are the cause of moldiness. The objection to the use of this bread by many people is its insipidity and want of a flavor the palate has from childhood become accustomed to. To mend this defect, Liebig recommends the addition of from 4 to 8 liters of good vinegar upon 100 kilogrammes of flour, and to correspondingly decrease the quantity of water. When it is desired to give to this kind of bread the taste of soldier's bread, *pain de munition*, one should add to the dough and mix up with it 250 grammes of rather dry, not too rich, cheese. Liebig observes that, at Münich, bread is now largely made according to the plan described; it only takes four hours to convert a hundred weight of flour into bread. As will be readily observed by the majority of readers, Liebig's process is on a small scale. Dr. Dauglish's system, the celebrated German *savant* observes, has, neither in Paris nor other French towns, taken at all well. The same applies to Belgium and Holland. Instead of rye meal, wheaten flour can be taken."

THE Prussian Admiralty has determined upon a novel experiment in the art of naval warfare. The *Ariadne*, a corvette now building, is to be armed with six guns of very heavy caliber (seventy-two and ninety-six pounders, according to the Prussian terminology), capable of doing grievous damage to cuirassed ships a long distance off. As the *Ariadne* is to be only of wood, she will not dare to approach the iron monsters of the sea close enough to offer them a direct mark; but what would constitute her weakness at close quarters, will, it is expected, render her all the more formidable at a distance. Being much swifter in her movements than the ironclads, it is expected she will engage them at an advantage, miles off, and by her maneuvering prove a dangerous enemy to the strongest of them. A single well-aimed bullet shot from her decks, would certainly be enough to create dreadful havoc in ships protected by eight or nine-inch plates of the best kind hitherto in use.

DEATH FROM THE EXHALATIONS OF QUINCES.—One of the papers of Lyons, France, records the occurrence of death by asphyxia suffered by a lady who slept in a room in which were also kept a quantity of quinces. The effect of the odor emitted seems to be analogous to those produced by the odors of some flowers. In this case, according to scientific evidence, the air of the room was largely vitiated with a peculiarly suffocating perfume, and a very considerable amount of both carbonic acid and carbonic oxide gas. The room in question was always used as a bedroom; no fire had been lighted in it, nor was any other discernible cause for the death of this lady found but the exhalations of the fruit.

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REMINISCENCES OF THE EARLY DISCOVERIES IN ELECTRO-MAGNETISM.—INTERESTING ANECDOTE OF FARADAY.

The sublime discovery known as electro-magnetism is one of the wonderful outgrowths of the nineteenth century. It owes its origin to the great philosopher Franklin, who first really brought electricity into practical use. Although Franklin was content only with atmospheric electricity, yet his great achievement led other men of science to investigate, and finally to achieve greater and more useful results from this yet mysterious element.

It is well known that from the various phenomena of electricity proceed all those abstruse subjects, such as magnetism, electro-magnetism, magneto-electricity, etc.

Electro-magnetism has been employed more than any of the various modifications of electricity. Simply because it was more obedient to the aid of man. Hence the application of it to the working of the telegraph, to plating, and the various other uses now in existence.

In 1837, Thomas Davenport, of Brandon, Vt., obtained a patent and came to New York with a model of his electro-magnetic engine, the working of which astonished the scientific men of that day. It was predicted and fully avowed that he had wrought out the great discovery of the use of electro-magnetism as a motive power. His model was very simple, having two electro-magnets, placed within attractive distances of a revolving steel magnet. These magnets were so arranged that one was acted upon by the attractive power and the other by the repulsive. He declared that it was only necessary to increase the size of the magnets in order to produce any amount of power required. This led many inventors to turn their attention to the subject, and other models were soon brought forth. Not exactly on the principle of Davenport's, but more upon the power of direct attraction alone.

Various machines were made, all of which were pleasing and wonderful to behold, but they possessed no practical value from the fact that the power obtained was entirely inadequate for practical use.

Davenport engaged a Capt. T. and a Mr. P. to go to England with a model and secured a patent there. They were quite successful in engaging the interest of men of wealth in their patent. Having means at their disposal they built a large working machine, with four of the largest electro-magnets then known, each weighing about three hundred pounds. These magnets were charged from a battery of copper and zinc containing a solution of sulphate of copper which, when dissolved, was of the capacity of a barrel. With a cast-iron wheel six feet in diameter, weighing 600 pounds, a velocity was attained of seventy-five revolutions per minute.

To the eye of the unpracticed in electro-magnetism, and even to the scientific, this was a vast stride towards the final result. Men of science, and very many practical mechanics of London, were invited to witness this great model. Among the number were the three well-known and highly appreciated Professors—Wheatstone, of King's College, Daniel, the inventor of the Daniel's battery, and the great scientific man of England, Faraday. The interest these men evinced in their examination of the model is worthy of record.

Professor Wheatstone, who has since identified himself with the magnetic telegraph in England, was loud in his praise of the working of the model. Professor Daniel was also enthusiastic in its favor, and prophesied that the days of steam were numbered: that electro-magnetism would become the leading motive power of the world. He said ships would soon traverse the ocean with only a few sheets of zinc for fuel and a small supply of acid—yea, not even acid for the waters of the ocean could supply its place.

To-day where are all these predictions? No more realized than they were nearly thirty years ago when they were made.

Notwithstanding all the varied experiments made to utilize this sleeping power of the magnet, it has as yet baffled the skill of the most skillful, and is to-day no nearer its accomplishment than when these great men of science gave their opinion.

The opinion given by Professor Faraday, the man of all others whose word was most powerful for good or ill of the success of the Davenport machine, was quite remarkable. He saw the wheel revolve for several minutes and watched with an appearance of astonishment the large electric spark which was given off every time the current was broken, a spark so large that it emitted a light in the evening sufficient to illuminate the room so that a newspaper could be read.

He spoke not one word of its merits or demerits, but taking up a broom which happened to be in one corner of the room, he gently placed the handle of it on the periphery of the wheel, and with a slight pressure the wheel gradually revolved slower. He did not, however, quite stop the motion, yet he saw how easily it could be done. Then came that nobleness of spirit and heart which has so characterized the man since, and will ever keep his memory in sweet remembrance by those who came in contact with him: none more than the Americans who were interested in this machine. He walked into an adjoining room and kindly informed those most interested that his opinion expressed to the public would greatly injure the sale of the patent. So he preferred not to advance one then, yet he would if strongly urged. His pleasant voice and kindly words of cheer, and hope for some greater discovery in electro-magnetism by which the great wish would be gratified, made a lasting impression.

How true that sagacious man's words have proved, the recorded history of the many failures will most surely attest. Thousands of dollars, many thousands, have been spent in vain, and yet there are men now living who predict the final achievement by which electricity will become the motive power of the whole world: when in reality the lightning of heaven shall become obedient to man's will, and the shuttle be moved by its power, and along the iron rail no sound of steam shall be heard—no smoke, no explosions, nothing but simply the slight decomposition of metals, all of which can be recove red again, shall take place.

CONFECTIONERY---HOW IT IS MADE, AND WHAT IT IS MADE OF.

The chief material in the manufacture of confections is sugar. There are two principal kinds of sugar. Cane sugar, and grape sugar, differing from each other in the following particulars. Cane sugar has a specific gravity of about 1·6. Water at 60° dissolves one third its own weight of it. Upon concentration of its solutions it deposits in small brilliant crystals, which if the sugar be pure are perfectly white. Absolute alcohol dissolves one eightieth of its own weight of cane sugar. Its solutions by long continued boiling become modified in character so that crystallization will not take place on cooling. Alcoholic fermentation takes place in its solutions only when a portion has become converted into grape sugar by the presence and chemical action of another substance—yeast.

Cane sugar is obtained by the concentration of the juices of the sugar cane, beetroot, sugar maple, and some other plants. Its chemical composition is by weight: carbon 72 parts, hydrogen 9 parts, oxygen 72 parts, water 18 parts. These proportions are expressed by the chemical formula: $C_{12}H_9O_9,2HO$.

Grape sugar is less soluble in water, and more soluble in alcohol. It is not so sweet, two parts of cane sugar being equal in this respect to five of grape sugar. Cane sugar crystallizes in prisms. Grape sugar either forms tubercular concretions, or fibrous acicular groups. It contains carbon 72 parts; hydrogen 14 parts, oxygen 14 parts; its formula being $C_{12}H_{14}O_{14}$ or $C_{12}H_{12}O_{12}+2HO$. Cane sugar loses its water at a temperature of 400° and becomes brown, deliquescent, and slightly bitter, in which state it is called caramel, used largely as a coloring for factitions wines. Grape sugar is converted into caramel at 284°. When strong sulphuric acid is poured into a concentrated sirup of cane sugar, and the mixture stirred, it turns brown, then black, heats, boils up and passes into a black and bulky mass—charcoal. When a solution of grape sugar is treated in like manner, a brown compound is formed having acid properties. Grape sugar is obtained from fruits, and by the action of dilute acids upon starch.

There is still another variety of sugar called fruit sugar, it is uncrystallizable but it becomes grape sugar by combination with water. Cane sugar is converted into grape sugar by yeast. Honey is probably nearly identical with the uncrystallizable fruit sugar.

We have seen that only cane sugar will produce well defined prismatic crystals and as an admixture of either fruit or grape sugar would render the crystallization imperfect, and as the change of cane sugar into grape sugar is facilitated by the presence of impurities, the sugar employed in the manufacture of candy should be cane sugar of a good and pure quality. Maple sugar is seldom made in so perfect a manner, that it will make a solid undeliquescent candy.

The perfect crystallization of sugar may be partly prevented by stirring while its solutions are cooling, or by the sudden cooling of a hot mass of melted sugar, and working it while still in a plastic state. The "white rock candy" of the shops is a good example of pure crystallized sugar. This candy is made by suspending in a very concentrated sirup, strings which act as nuclei for the formation and attachment of the crystals. [See article entitled, The Phenomena of Supersaturation, on page 323 of the current volume of the SCIENTIFIC AMERICAN]. It is perfectly pure sugar.

The ordinary hard stick candy is an example of the amorphous condition produced in sugar by working it while in a plastic state. In order to aid in producing this condition of sugar, a little cream of tartar is added which has the effect to prevent crystallization. The sugar while in a plastic mass, is pulled. A portion of it being taken in the hands of the workman, is drawn out partially by the hands. The middle of the mass is then thrown over a hook provided for the purpose and the ends being still grasped the workman steps backward thus drawing the mass into a sort of rope. This rope is doubled and the process repeated until the proper consistency is attained when the sugar is divided into sticks and allowed to become cold and hard. The soft candies are variously made, corn starch, being often an ingredient.

We have room in this article for only a very brief description of the special manipulations employed in making the different styles of candies. Stripes are put on sticks by laying upon a plastic roll of sugar while still hot, colored bars of cold sugar, which becoming soft in contact with the hot sugar, are drawn out with it to the proper size. Candies designed to be very clear and transparent are not worked by kneading or pulling. To make lozenges the plastic sugar is rolled into a sheet of the proper thickness and the lozenges are cut out like crackers from dough. These are placed when hard and cold in a jar and a quantity of whatever essential is desired to flavor them is put into the jar. The jar being closed, the volatile nature of the oil enables it soon to equally permeate the entire mass. The coating of seeds or meats of nuts is done by rolling or shaking them in a copper pan in contact with a small quantity of melted sugar. The sugar is added gradually until the coating has reached the required thickness.

The use of poisonous colors is not so frequent at present as formerly. Red and yellow candies are very rarely colored with poisonous matter. The greens are most liable to be poisonous, especially the light shade called apple green which sometimes consists of arsenite of copper, a very poisonous substance.

Attempt to Demolish a Lighthouse.

The keeper of Minot's Light had retired to rest for the night on Wednesday, and his assistant was proceeding to the top of the structure, when a great crash was heard, resounding through the whole substantial building. The lighthouse keeper supposed his assistant had, by accident, broken some glass vessel or other, but the latter, with alarm on his countenance, soon reported that the plate glass constituting one side of the great lantern at the top of the lighthouse had been smashed in, perhaps by a rifle ball. Examination was immediately begun to ascertain the cause of the occurrence, and after a little time the discovery on the ledge of the lighthouse of a dead shell-drake duck, with nearly every bone in its body broken, explained what would otherwise have been a very mysterious affair. The little winged wanderer was probably flying at a great speed, and being attracted by the light precipitated itself against the glass, and the concussion brought its career to a sudden and untimely close. The glass broken was more than a quarter of an inch in thickness, and it is impossible to replace the pane that was thus summarily displaced with glass, equally thick, purchased in Boston. The duck which achieved this feat, although his bones were broken, had no contusions on the exterior of his body. He was cooked, eaten, and pronounced excellent by the lighthouse keeper and his family.—*Boston Transcript of Nov. 14th.*

The attraction of light for birds as well as insects is so well established that the above occurrence need not be deemed incredible. We recollect a case where a gull broke the glass of the lantern of one of our light-houses on the South Carolina coast, during the war, and fell to the rock, instead of passing through the glass, and serving as boned turkey for the light-house keeper, as in this case.

Editorial Summary.

WE regret to be compelled to record the death of our late carrier, Carlisle McKee, who has served us faithfully for many years. He was a man who, although occupying a humble position in life, was possesssed of singular intelligence and large information. He spoke several languages with fluency, and it was his pride to keep thoroughly posted on current events of interest, political and otherwise. He was obliging and prompt in the performance of his duties, and in his connection with us made many friends among our city readers, by whom he will be missed, and who will regret to learn of his decease.

A REMARKABLE combination of physical forces, applied to purposes of war has lately been made the subject of experiment at Antwerp with a view to the defense of the passes of the Scheldt. Torpedoes are placed in the river, and cameras similar to those used by photographers are adjusted, so that an object directly over one of them will present its image in the instrument situated upon the shore at any convenient distance. As soon as the image of an approaching hostile vessel appears in the camera, an electric current is sent through a wire to the torpedo which underlies it, and the explosion takes place.

IMPROVED CHINA INK.—A correspondent of the *Building News* gives an account of a new preparation of China ink. The preparation is a solution of the ink in a chemical liquid which renders the glue used to agglomerate the carbon particles insoluble when it becomes dry on the paper in the usual way. The lines made by this ink will not wash in coloring a drawing. The preparation has the advantage over other solutions of China ink, that it will not decompose by long keeping.

THE American Institute announce a course of scientific lectures at Steinway Hall, beginning on the evening of the 25th inst., on which occasion Professor Barnard will lecture upon the microscope. We shall announce the other lectures in order.

WATER is a cheap and useful lubricant in the machine shop. Oil is costly and not always so effectual.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

AMERICAN MANFACTURE OF CALICO.—The calico interest of the United States is an important one. The total product of printed goods in 1836 was about 3,000,000 yards. In 1836 it reached 120,000,000. In 1855 there were twenty-seven print works in the United States, which produced in the aggregate 350,000,000 per year. This amount, at an average of ten cents per yard, was worth $35,000,000. In 1854 our exports of printed goods amounted to $3,000,000 Our imports of printed cottons in 1856 reached $19,119,752. Our exports in 1857 were only $1,785,685 worth. The total production of printed goods in 1860, according to the census of that year, was $7,748,644. There are 6,000,000 cotton spindles now in operation in the United States, of which over 2,000,000 are running on cloths for printing, and produce 450,000,000 yards.

A single locomotive and machine company of Paterson, N. J., turns out seventy locomotives and about $300,000 worth of cotton machinery yearly. Employment is given to about 700 hands.

The Spathic Iron Company is at work in the steel mine in South Plymouth, Vt., night and day, with two sets of hands. The ore grows richer as they go down.

The British Government have spent in experiments upon firearms at Woolwich $140,000 during the last five years.

The Louisville and Nashville Railroad have recently negotiated a loan with a view, it is said, of purchasing several smaller roads.

St. Louis refused by a majority of 8,336 to make an appropriation of $2,000,000 in aid of the projected railroad to Chilicothe.

The directors of the Hudson River Railroad have ordered their stock transfer books closed until the 1st of December.

The Cerro de Pasco Railroad Company has been formed in Lima and the greater part of the capital subscribed. This will be the first railway made in the interior of Peru.

The Baltimore and Potomac Railroad is progressing as rapidly as it is possible. The right of way in most cases has been secured and paid for.

Great activity is said to prevail now in the mines of the granite district in Colorado.

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One week's production of the Slaughter House Gulch, in Colorado was recently 3,000 ounces of silver.

The nine-hundredth mile post on the Union Pacific Railroad west of Omaha has been passed.

The Union Copper mines in Calaveras county, Cal., have been sold at auction for $121,250.

The Indianapolis rolling mills use daily twenty car loads of Missouri iron.

One firm in Portland, Maine, have manufactured 24,000 planchettes.

Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

PRESERVE JARS.—Nat. Raymer, New Sterling, N.C.—This invention relates to a new and improved method or process of preserving fruit and other articles, and it consists in such an arrangement as allows the air to be extracted without the use of steam, thereby adapting the can to ordinary use in families where facilities for putting up fruit on a large scale are not enjoyed.

HOEING MACHINE.—Horace C. Briggs, West Auburn, Me.—This invention has for its object to furnish an improved machine by means of which the ground between the rows of plants may be thoroughly stirred up and turned over, and the soil thrown around the roots of the plants, and which shall at the same time be simple in construction and easily operated.

HAY CUTTER.—Henry Kinsey, F. W. Kissell, J. E. Smith. and J. M. Smith, Ligonier, Pa.—This invention has for its object to furnish an improved machine for cutting hay, straw, and other fodder, which shall be simple in construction, easily operated, effective in operation, and self-feeding.

PAPER MAKING MACHINE.—James Viney, Manchester, N. H.—This invention relates to an attachment to machines for manufacturing paper, whereby the process is greatly facilitated and much valuable time is saved.

STEAM PUMPING ENGINE.—Ralph R. Lee and Geo. H. Wren, Mahaney City, Pa.—This invention relates to the manner in which the valves of pumping and other engines are operated, and it consists in the construction of the main valve and steam chest, and the manner in which steam is admitted thereto for the movement of the valve.

MACHINE FOR SEPARATING THE PULPY MATTER FROM FIBER-PRODUCING LEAVES.—G. Sanford, Bergen Point, N. J.—This invention consists of a wheel arranged to rotate in a vertical plane, which is provided with combs and scrapers arranged upon its sides radially and operating between vertically suspended holders for the material to be operated on, which is previously crushed between rollers, the said holders being provided with means for pushing them against the combs or scrapers as the thickness of the mass being combed varies. Provision is also made for supplying water to the mass as the combs and scrapers are acting upon it.

TANNING APPARATUS.—Silas Hosmer, Concord, Mass.—This invention consists in the arrangement or combination with a vacuum tanning vessel, of an agitating mechanism to produce and maintain currents in the liquor bath containing the skins to equalize the action of the liquor on the skins.

VELOCIPEDE.—E. K. W. Blake, Chicago, Ill.—This invention consists of an arrangement of loose hollow pulleys on the driving axle, having pawls taking into ratchets within the said pulleys secured to the axle, and belts for operating the pulleys passing over guide pulleys at the front of the machine to the hands of the operator, whereby he may propel the machine by pulling from directly in front of him. Springs connected by cords to smaller drums on the said pulleys are used for retracting the pulley to wind on the operating belts.

SAFETY LOCK FOR FIRE-ARMS.—Michael Tromly, Washington, D. C.—The nature of this invention consists in constructing the hammer in two parts, the upper one, containing the head, being so attached to the lower part that it can slide about a half inch upon the latter, and so operating that when the hammer is bent back to a "full cock" and sprung from that position, centrifugal force throws the head outward so that it can strike the cap and explode it; but when let down by the thumb or sprung from less than a "half cock," the head will not be thrown out in the manner described, but will strike upon a guard near the nipple, and be prevented from coming in contact with the cap. The hammer itself is so formed as to guard the cap when down.

EXCAVATOR.—Barna P. Stowell, Quincy, Ill.—The object of this invention is to construct an excavating machine to be operated by steam or other power, which shall perform its work in an easier and more expeditious manner than those heretofore invented, and which shall be economical and convenient of operation.

CAR COUPLING.—James Osman, and John F. Potter, Linden Hall, Pa.—The object of this invention is to accomplish the coupling and uncoupling of cars in a safe and ready manner.

WATER WHEEL.—J. H Bodine, and T. A. Hill, Mount Morris, N. Y.—In this invention the gate is made in a peculiar form to adapt it to be opened and closed with less power and a novel device is employed for the purpose of moving it. In addition to this, the curb is so constructed that, as the step wears away the joint between the wheel and the curo still remains water tight.

AWNING OR HORSE CARS.—Manfred C. Battey, Washington, D. C.—The object of this invention is to provide a neat, light, strong, and cheap attachable and removable awning, to be used in connection with horse cars on street railways, for the purpose of protecting the horses from the excessive heat of the sun.

TANNING PROCESS.—C. J. Bugh, Eau Claire, Wis.—This invention has for its object to furnish a superior tanning process by means of which furs and hides may be easily, quickly, and thoroughly tanned.

SELF-SETTING TARGET.—William Stein, Camden, N. J.—The object of this invention is to construct a target which will produce a constant display of passing objects to the practitioner, said objects or aims being hinged, so that they will be turned down, when hit; but after being thus turned down, they will be automatically set up before they are again exposed to the view.

STEAM WHISTLE.—Bernhard Weinmann, Cincinnati, Ohio.—This invention relates to a new steam whistle, which is so arranged that the sound produced in it can be regulated at will. The invention consists in arranging either one or both ends of the tube of a steam whistle adjustable, so as to thereby make the length of the tube variable.

TURBINE.—Albert M. Maynard, Savoy, Mass.—The nature of this invention relates to those horizontal water wheels known as turbine. It consists in the peculiar V-shaped formation of the turbine buckets, arranged on the inner side of a cylindrical box, in combination with a diaphram through which the shaft passes, together with other devices perfecting the whole.

BRIDLE BIT.—W. F. Clark, Hagaman's Mills, N. Y.—The object of this invention is to provide a simple bit and bridle for horses, which combines several advantageous features, each of which are herein duly set forth.

SPINNING JACK.—Jacob Sands, Waterloo, N. Y.—This invention consists in an arrangement of mechanism for automatically changing the friction belt, whereby the carriage is made to effect the said changes.

HORSE BRUSH.—Amos W. Brown, Lansingburh, N. Y.—The object of this invention is to furnish a flexible back to a horse brush that the brush may be brought to conform to the animal's body upon which it may be used, and thus cause all the bristles to bear and operate in the rubbing process. It consists in a jointing to the back of the brush and connecting the jointed parts with a steel plate or spring, or by suitable hinges in combination with a spring.

APPARATUS FOR HOLDING SHEEP.—G. D. A. Krigbaum, Zanesville, Ohio.—This invention consists of a bench provided with hinged legs or legs otherwise adjustable connected to it, and with four notches, two in each edge, about the size of the legs of the sheep above the ankles; and also with notched levers which are pivoted to the bench, one to each notch in the bench, so that the notches of the levers are co-incident with those of the bench. The sheep is placed upon his back under the bench and one leg secured in each notch by the levers which may be held in position by pins or otherwise.

PROCESS FOR DYEING AND RECTIFYING COPAL VARNISH.—Desso Duduit, New York City.—The object of this process is to clarify or rectify copal varnish and also to give it in a few hours that peculiar quality which renders it suitable for being used and which previous to my invention required to be "aged," that is to say, to stand from eight to ten months to allow this quality or change to be obtained spontaneously.

WATER WHEEL.—Vincent M. Baker, Preston, Minn.—This invention relates to a new and improved horizontal water wheel, and of that class in which power is obtained both from the percussive and reacting force of the water. The invention consists in a novel construction of gates and chutes and in a peculiar form of bucket, whereby several advantages are obtained.

BEE-HIVE.—J. H. Thurston, Rainsborough, Ohio.—This invention relates to a new and useful improvement in the construction of bee-hives, whereby a perfect ventilation is obtained and the hive kept dry during the winter season—free escape of the moisture exhaled by the bees being allowed, and consequently the condensation of the same on the walls of the hive, which is so destructive to bees in a closely confined hive, avoided. The invention also relates to a peculiar construction and arrangement of the bee entrance of the hive, whereby the bees are enabled to protect themselves against the encroachments of the bee-moth.

WIND WHEEL.—R. Waite, Blue Earth City, Minn.—This invention consists in a horizontal wheel having a spiral tapered vane of varying twist, enclosed in a correspondingly tapered case provided with bell months at each end, and with the means for regulating the passage of air at the receiving end or shutting it off altogether.

ANTI-FRICTION WASHER.—U. H. Reed, Jeremy Lake, and Luther Sisson, N. Easton, Mass.—This invention consists of a washer composed of two rings and a tubular section, one of the said rings and the tubular section formed to have an annular recess, when joined together, which is filled with spherical balls, which take the pressure of the screw or nut from the other ring which is held in contact with the balls by an outer annular projection, taking behind an inner annular projection of the tubular section, and which is free to turn on the balls.

BED BOTTOM.—Gustavus Reneky and Samuel Kiess, Edgerton, Ohio.—This invention consists in the manner of securing the springs to the frame; also, in the manner of securing the slats to the springs; also, in a manner of arranging some of the slats to economize the use of springs and in the arrangement of the parts forming the frame.

GARDEN ROLLER.—James B. Brown, Peekskill, N. Y.—The object of this invention is to so construct a garden roller, in which weights are suspended from the axle, that the said weights can be readily taken off and replaced whenever desired, so that the roller can be made more or less heavy at will, according to the kind of work to be done.

ATTACHMENT TO GLASSES AND TUMBLERS.—Johann Winkler, Hudson city, N.J.—The object of this invention is to prevent the froth of effervescent liquids, such as "white beer," soda waters, etc., from spattering into the face of the drinker, and to allow the real liquid to flow from the glass without being mixed with froth.

WATCH ESCAPEMENT.—Julius Hietel, John Wenzel Hietel, and John Loomis Geissler, Philadelphia. Pa.—This invention relates to a new manner of constructing the lever of an escapement, and consists in the application and arrangement of a self-regulating spring lever, which will, when the watch is shaken or violently agitated, allow the ruby pin to pass, and which will therefore permit the balance to turn freely under the influence of such shock or motion. The object of the invention is to prevent the breaking of the ruby pin, which in ordinary lever escapements is frequently the case, and to still, at the same time, avoid the complications of the chronometer escapement in which the same freedom of the balance is provided.

HARNESS TREE AND PAD.—W. A. Sharp and John A. Shannon, Tama City, Iowa.—This invention consists of a tree or yoke made of wood or other suitable materal sufficiently arching to bridge the back of the animal, and adjustably connected at each end to pads of improved construction.

LANTERN.—George W. Putnam, Peterboro, Town of Smithfield, N.Y.—This is a useful invention for travelers and others. It burns a piece of full-sized candle, enough to last two and a half hours. It is provided with a magazine which carries extra candles and matches. This magazine draws out behind when the lantern is in use, and is pushed in when the same is closed, The whole thing is quite compact and strong.

WINDMILL.—Charles Goodwin, Beardstown, Ill.—This invention consists in so arranging the wheels upon the shaft of a windmill, with reference to the other parts, as to cause it to act as a vane or tailboard. Also, in providing a vane in front of the wheel, above the shaft, and at an angle with it, to prevent the resistance of the wheel on the vertical shaft from working the wheel edgewise to the wind, and also in providing the wings with springs which will allow them to open when the wind blows hard, and close again when it subsides.

BUTT HINGE.—William Wells, Ashtabula, Ohio.—This invention relates to an improvement in butts for hanging doors and gates, and for similar uses, whereby such doors or gates are made self-closing by the action of a spiral spring.

APPARATUS FOR BURNING PETROLEUM.—Louis Verstraet, Paris, France.—This invention relates to improvements in the use of petroleum, or other mineral oils, for fuel for generating steam in steam boilers, and for other purposes.

FAN BLAST PORTABLE FORGE.—John B. Bolinger, Detroit, Mich.—This invention relates to the means employed to supply the air blast to a portable smith's forge.

BURGLAR-PROOF LOCK.—William F. Ensign, New York city.—This invention relates to a new and improved lock of that class which are provided with a series of circular tumblers having notches or gateways in their peripheries to receive a stump and admit of the bolt being thrown back.

FRUIT BASKET.—Charles Moore. Stratford, Conn.—This invention relates to a new and useful improvement in the construction of fruit baskets such as are used for carrying small fruit, berries, etc., to market. The object of the invention is to obtain a basket which may be manufactured cheaper, and be far more durable than the various wooden baskets now in general use.

LOCK.—Amos S. Blake, Waterbury, Conn.—This invention relates to a new and improved lock, and is designed to supersede the various locks used for freight and baggage car doors, and the ordinary padlock generally, as this invention is applicable in all cases where the ordinary padlock may be used. The object of the invention is to obtain a lock which may be used in all cases where the ordinary padlock may be applied, and without the liability of being injured by water getting within it, or being rendered inoperative or incapable of being opened or unlocked on account of ice—objections which attend the use of the ordinary padlock.

Answers to Correspondents.

CORRESPONDENTS who expect to receive answers to their letters must, in all cases, sign their names. We have a right to know those who seek information from us; besides, as sometimes happens, we may prefer to address the correspondent by mail.

SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of a purely business or personal nature. We will publish such inquiries, however, when paid for as advertisemets at $1 00 a line, under the head of "Business and Personal."

☞ *All reference to back numbers should be by volume and page.*

W. T. H., of Wis.—The trouble with your microscope is undoubtedly imperfection in the lenses.

J. T. E., of Mich.—Shellac varnish made with alcohol, is a good preparation to prevent iron from rusting, but it will not stand wear neither will any other varnish.

E. R., of N. Y.—Stains obtained in making cider and paring apples may be removed from the hand by lemon juice, or citric acid, obtainable at any drug store. We know of nothing that will prevent rubber boots from cracking, but they may be mended by the use of rubber dissolved in benzine.

E. J. N., of Cal.—To separate gold from copper, dissolve in nitro-hydrochloric acid, (*aqua regia*). Precipitate with a solution of protosulphate of iron; the precipitate washed and fused will be pure gold.

J. A. S. of Texas.—We have never had any trouble in keeping our razors in order by the use of an ordinary strap. If you are a barber by trade, and have not acquired the art of keeping your razors in condition, we do not think printed instructions on the subject would be of any value.

P. C. C., of Pa.—"If a boiler with pressure of steam at 30 lbs. to the square inch be heated until its pressure is 100 lbs., has the last mentioned steam less moisture in it; and if so has part of the steam first mentioned (30 lbs) been condensed by additional pressure back to water?" In reply we ask if a bladder be half filled with air and then heated until entirely filled is there more air in it when at the point of bursting then when the bladder was flaccid? In other words, do you in generating steam from water expand the water or the gaseous products of water and heat combined? Suppose you pass your steam at 30 lbs. pressure into a heater having no water, as is done every day in hundreds of boilers, cannot you get the heat of 338° Fah. and the consequent pressure of 100 lbs? In other words, do you know what is meant by dry steam?"

J. W. C., of N. Y.—"I inclose a diagram representing the half of a revolution of an 18-inch crank and ask why, if the ordinates on an indicator card represent the power exerted by the engine, this does not represent the effective length of a crank of 18 inches; the ordinates being measured the same as in an indicator diagram using, however, a common scale rule? If they do then there is a gain in the use of the crank." The indicator is in no sense a crank. It represents the action of a reciprocating body, and even if the ordinates used in measuring the stroke of an engine and the half revolution of a crank were the same, these are all the elements the two cases have in common. The calculations necessary for measuring the proportional powers of the crank between right angles to the piston rod and the dead center have no analogy to those used in estimating the varying powers of steam at different portions of the stroke.

Business and Personal.

The charge for insertion under this head is one dollar a line. If the Notices exceed four lines, an extra charge will be made.

For a complete 10-acre fruit farm, address box 83, Burlington, N. J. Several larger farms, and easy payments.

Patent improvement for sharpening circular saws for sale. Persons buying and selling patents will communicate. D. Huffman, Luray, Va.

Parties about to buy scroll saws should examine the new patent scroll saw which was exhibited by J. W. Mount, of Medina, N. Y., at State Fair. See New York Times, Oct. 16, 1868.

To party paying for foreign patents ($550) one-half interest. Immediate success. Sale immense. Box 2137, postoffice, Philadelphia.

Send $1 for 12 new pictures for the zoetrope, or a stamp for complete catalogue to Milton Bradley & Co., Springfield, Mass.

A wealthy person is wanted to assist in developing several new patents. Address Rt. Rev. Adolphus E. Damus, Chief Librarian, Austin city, Texas. Postoffice box 259.

Manufacturers and machinists who want orders, read Boston Bulletin, whose reports of manufacturing news of the U. S., show who needs machinery, etc. Address Boston Bulletin. Terms $4 a year.

For lighting street gas lamps, address the London Torch and Gas Lighting Company, 569 Broadway, New York.

For the best tin folder for turning a nice fine lock or a nice round lock for wiring. Also, Whitney's patent Tinsmith's stakes. The greatest improvement of the age. Address A. W. Whitney, Woodstock, Vt.

Peck's patent drop press. For circulars, address the sole manufacturers, Milo Peck & Co., New Haven, Conn.

The Lillingston paint, described Nov. 18, in Scientific American, can be had at 528 Water st., New York. Address Lillingston Paint Co.

Will Ransom Rathbone, of New York, who took out a patent for a wad greaser, please send his present address to A. E., box 1760, New York Postoffice.

For descriptive circular of the best grate bar in use, address Hutchinson & Laurence, No. 8 Dey st., New York.

Hackle and Gill Pins, address J. W. Bartlett, 569 B'dway, N.Y.

For sale—Newhart & Co. plow factory, Terre Haute, Ind.

Wants to sell rights to manufacture the simplest and best cider mill made. Address H. Sells, Vienna, Ontario.

American Watchmaker and Jeweler. By J. Parish Stelle. Jesse Haney & Co., 119 Nassau st., New York. Price 25 cents.

C. J. Fay's patent water-proof roofing, Camden, N. J.

For solid wrought-iron beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for Lithograph, etc.

Portable pumping machinery to rent, of any capacity desired, and pass sand and gravel without injury. Wm. D. Andrews & Brother, 414 Water st., New York.

N. C. Stiles' pat. punching and drop presses, Middletown, Ct.

Prang's American chromos for sale at all respectable art stores. Catalogues mailed free by L. Prang & Co., Boston.

For breech-loading shot guns, address C. Parker, Meriden, Ct.

The paper that meets the eye of all the leading manufacturers throughout the United States—The Boston Bulletin.

NEW PUBLICATIONS.

READY RECKONER FOR SAWMILL MANAGERS.

We have received a chart intended for the use of sawmill owners and operators, giving the amount of lumber, in boards, joists, scantling, etc., that may be sawed from a log or bolt of any ascertained diameter. It is arranged in tabular form on one sheet, convenient for reference and handy to be posted in the mill. It has full directions for use printed on the same sheet, and is as easily understood as the ordinary chart for a screw cutting lathe. The table is the result of experience and observation by a practical sawyer, and appears to be well adapted to subserve its purpose. Copy right secured by the author, Titus Whitmore, Yankee Settlement, Clayton Co., Iowa. Price 60 cents single. See advertisement on another page] under the heading, "To Mill Owners and Sawyers."

THE ATLANTIC MONTHLY for December contains, among other excellent articles, a good one entitled "Our Painters," the second article on "Coöperative Housekeeping," "A Day at a Consulate," etc. The new volume begins with the coming January number, with promised contributions from J. Lothrop Motley, James Russell Lowell, Edward Everett Hale, James Parton, and other distinguished writers. The well-known firm of Ticknor & Fields have dissolved by the retirement of Mr. Ticknor. The successors are Fields, Osgood & Co.

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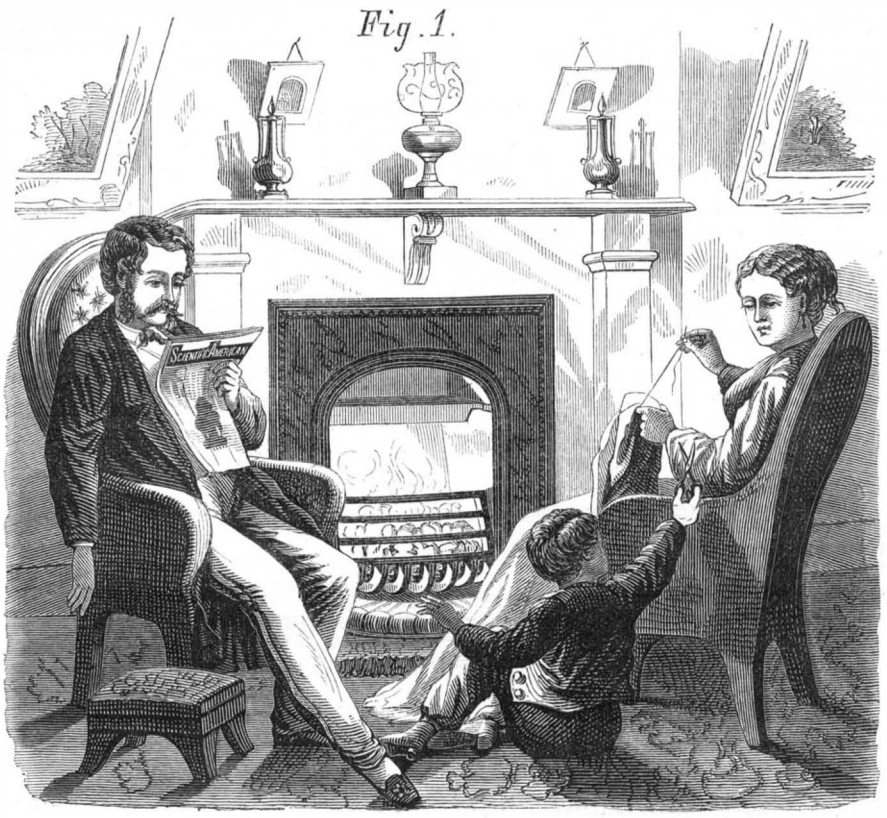
Improvement in Open Grates.

All who value home comforts understand the enjoyableness of a glowing open fire, notwithstanding the superior heating qualities of heaters and closed stoves, and many prefer the inevitable waste and additional costliness of the open grate, with its home-like pleasantness, to these more economical and less healthful appliances. If the grate or open fireplace could be made to yield the same amount of heat that the stove does, at no greater cost, every one would prefer it, for there is nothing to which poor human nature is more addicted than "seeing faces in the fire" and poking burning coals.

To extend these comforts is the object of the improvement shown in the engravings. Fig. 1 shows a pleasant family group enjoying the quiet of home and the warmth of a good fire.

Fig. 1.



HATTAN'S PATENT FIREPLACE.

Fig. 2 is a sectional view of the device. A is the fire box or receptacle for the fuel. B is the flue through which the smoke or other products of combustion pass to the chimney. C is a sliding plate, moving on lugs or ledges in the sides of the fireplace and passing through a slot in the back. D is an air tube below the movable plate for inducting air to the gases of combustion. E is an angular wing or flange on the front of the sliding plate, C, for convenience in moving the plate back and forth by a poker or other utensil.

It will be seen that the throat of the flue may be increased or diminished in area as the plate, C, is moved back or forth, while at the same time the plate may be used to deflect more or less of the heat of the fire into the room, according to its position. The current of atmospheric air that passes through the tube, D, mingles with the ascending heated gases, and by its provision of oxygen, induces an additional combustion.

The inventor very truly says that "by the ordinary method of combustion in fireplaces or grates a large percentage of the fuel passes up the chimney unconsumed for want of an additional supply of air *properly applied*. This invention meets the difficulty effectually. As the heated gases impinge against the movable plate they meet with a new supply of air and are thus to a good degree consumed, the available heat is increased, and the waste of fuel saved." He says further that forty of these improved grates have been set and tested, all of them giving full satisfaction.

Date of patent August 4, 1868. The patentee, D. Hattan, may be addressed for further information, at Zanesville, Ohio.

THE TRANSPLANTING OF LARGE FOREST TREES.

In this fast age when people seem too impatient to await the slow and normal growth of anything; when the demand seems to be principally for things ready made, it may be useful and interesting to notice some methods for the transplanting of large trees. The season is also at hand when the necessary preparations must be made for this purpose.

We recently discussed the subject of circulation in plants and its relations to their growth and nutrition. The principles noticed in the article referred to have an important application to the present subject. We have said that the "blood of plants" enters the circulation through their roots; but the power of the roots to absorb, depends principally upon the rootlets found in greatest numbers at the extremities of the principal root branches in trees and shrubs. In young trees in vigorous growth a greater proportion of minute root branches are found than in old trees. The close contact of earth with these rootlets is necessary also to rapid and healthy growth. Nearly all plants suffer by transplanting on account of the greater or less rupture of this contact. Exceptions are of course to be made in regard to plants removed from pots, in which case the earth ball is comparatively little disturbed. The law of constitutional adaptation to circumstances holds good also with plants as with animals. A young tree growing in thick shade, will droop immediately if exposed to the hot sun, by the abrupt cutting away of the surrounding timber.

To transplant successfully then, it is necessary to change the conditions under which the plant is growing at the time as little as possible, or if considerable changes are requisite to make them as gradually as possible. The larger a tree is at the time of transplanting, the more difficult it is to observe this rule. Yet with proper method and care almost any tree not too heavy for transportation may be successfully transplanted.

The method most common in this country is to dig a trench about trees, deep below the surface, after they have shed their leaves in autumn, and letting them stand until the cold weather has frozen the entire ball. The trees are then tipped over by the use of a tackle, the frozen ball adhering to the roots, and the tree with the entire mass of frozen earth is then removed to the place designed for it. Of course this method is applicable only in cold climates, and cannot be applied to all trees, as the hard freezing necessary will kill many valuable and beautiful species.

The system adopted in Europe is a better one, more generally applicable, and based upon more philosophical principles than the American. When plants are potted, the roots at first shoot out in all directions through the soil. When they reach the walls of the pot they turn about and recurve toward the center again. In this way they interweave until the earth is so firmly held that the plant may be taken out of the pot with scarcely any disturbance of its roots. The same thing would take place if instead of meeting the hard impenetrable walls of the pot, the roots should approach a hard innutritious soil; the roots having the peculiar selective power which is found even in the lowest orders of living things, will return into the more nutritious soil.

The effect of a deposit of rich soil at or near the extremities of roots is to greatly promote the growth and number of the small roots. This principle, together with that of the selective power of the roots above mentioned, forms the basis of the European method of transplanting large trees. The tree being properly braced to protect it from the force of winds, a trench is dug about it and filled with very rich, light soil. The tree is then allowed to stand for one or two years. It can then be tipped over and the ball will not only remain, nearly unbroken, but the great number of rootlets which have developed themselves give much greater vigor to the tree when it is placed in the desired position. In transplanting the tree the ball is swung upon a truck adapted to the purpose, the top being allowed to trail.

DIMOCK'S THERMO-ANNUNCIATOR.

Perhaps no simple article of food is more difficult to cook uniformly than eggs. There is only one condition of the egg that may be always assured, and that is hard boiled—the most unfit condition for the stomach. Unless the water into which the eggs are put is kept violently agitated, by boiling all the time the eggs remain in, time is a very unreliable test of their condition when taken out; indeed, time is never a correct gage for boiling eggs. The inventor of the device shown in the engravings recognizing these facts, and appreciating the truth of the old maxim that "eggs badly boiled are good things spoiled," has constructed this apparatus to operate by a combination of time and temperature, rather than by time only—more heat requiring less time, and *vice versa*. It is correct in principle, and beautiful in design and finish, rendering it both useful and ornamental. It is seen in perspective in Fig. 1. The operation may be understood by a description of the section, Fig. 2. A is a reservoir, to be filled with water, mercury, or other expansive fluid, after which it is closed by a disk of thin rubber; a metallic ring or washer is placed over the rubber, and the reservoir is then screwed firmly into the cap, B, to which the standard pipe, C, is attached, thus forming a tight joint between the top of the reservoir and the rubber disk. In the lower part of the pipe is a plug, D, screwed to a stem, on which is an open spiral spring which holds the plug to the rubber. The stem has a thimble, or bell-shaped collar on its top, on the under side of which the catch of a hammer lever, E, engages, which, when released, is thrown sharply down; the hammer striking the bell (see Fig. 1) to give warning of the requisite amount of heat imparted to the eggs. An index cap, graduated with numbers and the words, *soft*, *medium*, and *hard*, is screwed to the top of the stem, and has vertical slots corresponding to the numbers, either of which fits a screw or pin in the side of the pipe. In operating, place the eggs in the receptacle, raise the index cap sufficiently high to disengage the vertical slots from the pin in the side of the pipe; then turn the index, placing the desired number opposite the hammer lever. The apparatus being latched in the act of lifting by the hammer lever, is then placed in a saucepan of water, either hot or cold, sufficiently deep to cover the eggs; as soon as a suitable amount of heat has been imparted to the fluid in the reservoir, to expand it sufficiently to raise the plug, D, and stem, the requisite amount, the hammer lever will disengage itself from the bell-shaped collar, and give warning of the amount of heat imparted to the fluid in the reservoir.

Fig 1

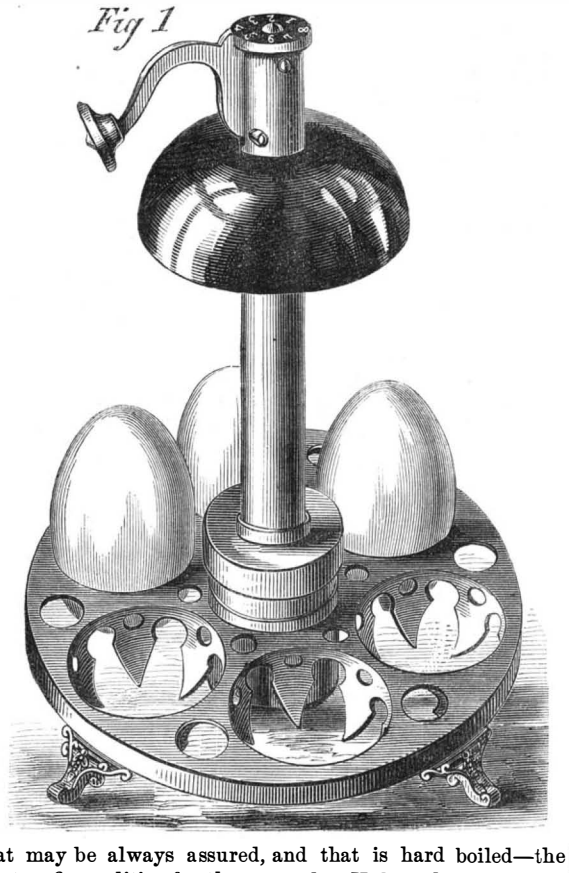
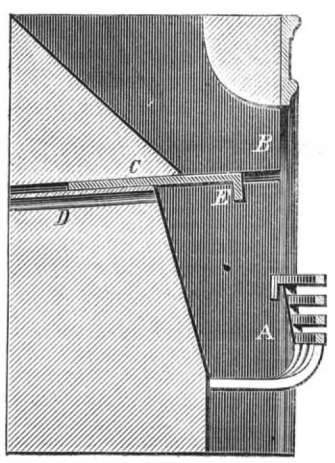


Fig. 2



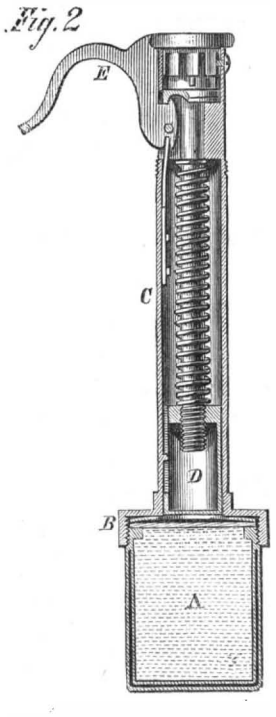
It is obvious that, as heat is transmitted to the eggs through the same medium as to the apparatus and under the same circumstances, the condition of the one will have a corresponding relation to the other, and the index being properly set, warning may be given when the eggs are cooked to any degree desired.

Patents for this invention have been obtained in the United States and abroad through the Scientific American Patent Agency by the inventor, I. Dimock, who may be addressed at Florence, Mass. The apparatus may be obtained of the Meriden Britannia Co.'s office, 199 Broadway, N. Y.

The Poison Generated in Putrefaction.

Drs. Bergmann & Schmiedeberg, have communicated to the *Centralblatt* (German) an account of the isolation of a crystalline substance, which they believe is the proper poison generated in putrefactive fermentation. This poison, the terror of the dissecting room, has hitherto been known only by its effects. The substance which these chemists have succeeded in isolating, they call the "*sulphate of sepsin*." The London *Lancet* gives the following details of its preparation. It is obtained by diffusion through parchment paper, precipitation with corrosive sublimate, from an alkaline solution, removal of the mercury by silver, of silver by sulphureted hygrogen, evaporation, and purification of the residue. Large, well-defined, acicular needles are thus obtained, which are deliquescent in the air, and, exposed to heat, melt and carbonize. They possess a powerfully poisonous action. A solution containing scarcely more than one-hundredth of a gramme was injected into the veins of two dogs. Vomiting was immediately induced, and after a short time diarrhea, which in the course of an hour became bloody. After nine hours the animals were killed, and, on examination, their stomachs and large intestines were found ecchymosed and the small intestine congested. Frogs could be killed in the same manner.

Fig. 2



Baron Rothschild, head of the great Jewish banking house, is dead. He left sufficient property to pay his debts and funeral expenses.

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VOL. XIX., No. 23...[NEW SERIES.]....*Twenty-third Year.*

NEW YORK, WEDNESDAY, DECEMBER 2, 1868.

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THE NATIONAL FINANCES.

The future of the financial situation, considered in a national point of view, is being extensively discussed. The subject is one of very great importance; in fact there is no question of national policy that requires more careful and thorough attention. We have noticed with much interest the suggestions offered by the press on financial affairs, and acknowledge our astonishment at the fact that many of these would-be doctors of finance seem ignorant of the true nature of the disease that is preying upon the vitals of the nation. That disease is the want of elasticity in the currency; it cannot adjust itself to the wants of the business population.

The *Financial and Commercial Chronicle*, an able exponent of finance and commerce, in its issue of the 7th inst., very frankly acknowledges that the situation is dangerous, and intimates that it will require extraordinarily judicious and experienced statesmen to guide the ship of state safely through the dangers which surround us.

"Our monetary circulation requires to be elastic enough to admit of such expansion now as would meet the legitimate demand. This elasticity, as we have often explained, is almost wholly wanting in our currency machinery. The rigid uniformity at which it keeps our circulating medium is one of its worse defects. And any man who can show us how it may be remedied will confer a benefit on the financial interests of the country, the magnitude of which it is not easy to over estimate."

The New York *Times* of the 14th inst., in an editorial very properly entitled "WANTED A FINANCIAL POLICY," complains and properly so, in most emphatic terms, of the impropriety of vesting in any one man such power as Secretary McCulloch now wields. It however makes no suggestion as to the duties of Congress in the premises, and the measures that should be adopted to avert disaster, except that the control of the currency should be taken from the Secretary of the Treasury. It asserts that the volume of the currency, the issue of bonds, the sale of gold, and other matters of like importance, all of which are now subject to the will of the Secretary, should be positively fixed by Congress; leaving him no power in the premises save to obey the law's behests. This done, the field of speculation will be greatly restricted, the uncertainty which at present prevails will be obviated, and the scandal which identifies an important department with unscrupulous combinations will come to an end.

The only plan calculated to remedy present existing evils in the monetary management worthy of notice, is the one put forth some time since by the *New York Mercantile Journal*, and more recently advocated by the *New York Herald* as a plan of its own devising, of which the former journal we think reasonably complains. These views are in our opinion worthy of attention. They are briefly as follows: "The country requires for the transaction of business a token that shall be universally acknowledged as the true representative of a dollar. The Government is competent to issue such a token, and no other standard or measure of a dollar should be tolerated. This of course excludes the paper issue of corporations, and the reasons for such exclusion are that such issues are unreliable in business emergencies, and that such corporations always willing to grant accommodation at times when accommodation is least needed, are in times of business emergency necessarily the most unaccommodating of institutions. These views also embrace the issue of legal tender notes convertible at the will of the holder into bonds bearing an interest of 3·65 per cent., said bonds being reconvertible into legal tender notes at will of the holder. It is contended that this would give perfect elasticity to the currency, as in times of redundancy the surplus over the ordinary needs of business would be absorbed by 3·65 per cent bonds, and that no pressure could by any possibility occur, as the people themselves have the power to obtain the legal tender as they want it.

That these views are gaining ground is evident from the tone of financial journals, and also from the following telegram to the New York *Times* of the 16th inst.:

"It has been announced lately that a bill is to be introduced into Congress at the approaching session providing for the issue of convertible and reconvertible 3·65 currency interest bonds for the purpose of preventing such pressures in the money market as has lately been witnessed."

That such a measure will be urgently opposed by the money kings, is, although an argument against the probability of its adoption, an equally strong argument in its favor. Those who fatten when healthy business stagnates, who live by speculating upon a business depression created by such operations as have recently occurred in this city, may be expected to be its bitter opponents. On the contrary the people will be its friends. Who will be victorious the future will show.

The *Tribune* of the 17th makes opposition to these views on the ground that a general depreciation of the currency would result, and that such depreciation would flood the country with currency by the rapid conversion of bonds bearing so low a rate of interest. We think these reasons erroneous. The issue of convertible bonds and legal tender is, as we understand the matter, intended to be limited in amount so as only to absorb the surplus over the immediate wants of business and commerce. This surplus for the most part never draws interest; upon the plan in question it would do so at the same time that it would be available at any moment for purposes of business. The banks of this city alone would absorb a hundred millions of the 3·65 bonds, and there is scarcely a business man throughout the country who would not invest in them. The mistakes of the *Tribune* are, that while money loaned in the usual way bears a much higher rate of interest than is proposed for these bonds, it does not recognize the fact that a large amount of money is always kept on deposit drawing no interest, and also that it regards the issue as limited only by the amount of the National debt.

We believe the proposition in question is destined to become prominent in the future, and we believe it contains the germ of a radical cure for our financial troubles.

MECHANICAL SKILL SHOWN WITHOUT MECHANICAL APPLIANCES.

It may be a cause of proper pride for a mechanic, who has all the materials and the tools necessary, to succeed in constructing a machine that shall yield good results; but if one not possessed of the skill obtained by long practice, and unsupplied with proper tools and materials, can attain the same result, to him should be accorded the name of the best mechanic.

Many of the models sent to us to show the principles of an invention or the points of an improvement tell of the difficulties which surround the inventor. They are frequently whittled out by the pocket knife with great expenditure of care, time, and labor, the materials not being adapted to the work; yet they bear indisputable evidences of close calculation, mechanical skill, and inventive talent. Some of them come from the backwoods of Maine, the winter haunts of our hardy lumbermen, and from their cabins, miles away from civilization, these models, wrought by the light afforded by pine knots, or by the blazing wood fire, come to us, and, through us, to the teeming millions of this and other continents, to enlighten, improve, and bless.

Others come from our yet unexplored and only partially occupied territories, the outposts of civilization, where the adventurous miner, trapper, hunter, and settler dispute with the adverse forces of nature and the cruel jealousy of the untamed savage his right to exist. All of these crude specimens of handicraft show the mechanical genius of our people and their wonderful adaptability to circumstances.

But many of these are really elegant specimens of art, and prove the workman to be more than a novice. Occasionally one comes to our office which is almost too elegant and costly to be packed away in the cabinets of the Patent Office. Such, for instance, was the model of an improved horseshoe, illustrated in our pages a short time ago, made of solid silver, and sent from Colorado. But for its weight and size, it would have made a beautiful charm, to be suspended from the watch chain, as it was elegantly engraved and highly polished; but being nearly a pound weight avoirdupois, it was rather too "hefty" for ornament.

To show what enterprise and natural mechanical talent may do, unaided by the appurtenances with which civilization enriches the mechanic, was probably the chief object of De Foe's immortal story of Robinson Crusoe. There is hardly an incident in this wonderful narrative, however it may tax our credulity, that cannot be equaled or duplicated even now. We remember a little circumstance, witnessed in Nova Scotia, where we found a saw mill in full operation, which, beside the saw itself and a few wrought nails and spikes, did not have iron enough in its construction to load a man's coat pockets. The building and the dam were of unhewn logs, held together by wooden pins; the wheel had not a particle of iron in its composition, not even a nail; the crank was of wood, the frame of the saw, the uprights, the sash—every portion—was of wood only. Even the shafting that lead to a circular saw was wood, running in wooden boxes, yet this "wooden concern" was every day turning out excellent work and gradually making its owner, who had never seen a machine shop, a rich man.

NATIONAL PRIDE OF MECHANICS.

No low sentiment is more reprehensible than that which assumes for some section or country an indisputable superiority over another, and yet we regret to say none is more common, and intelligent mechanics too often indulge in its exercise and manifest its effects. The honest and honorable pride in the success or superiority of those with whom we feel ourselves associated by companionship, nativity, or identity of interests is perfectly proper, and no sensible man will object to it; and if sensible he will be as ready to allow all well backed-up claims for others, as he is or should be, to sustain his own or those of his associates. The mechanic who is enough of a cosmopolitan to acknowledge the improvements of others, whether of his own country or race, or not, and to give due credit therefor, while maintaining the honor of his own people, is our idea of the true mechanic. The mechanic should be one of the most liberal of men, willing to impart his own knowledge and anxious to utilize that of others, while careful to acknowledge the source of his information. Dirty slurs against the value of others' improvements and unwarranted assumptions of superiority are no evidences of real excellence. When a prominent English mechanical periodical chooses to interpolate in a mention of a valuable American invention, favorably noticed, the statement that "what will please an American engineer will not satisfy *our* more refined mechanical tastes," we believe the writer is influenced by his national prejudices rather than by the facts. We are not prepared to acknowledge that the English have more refined mechanical tastes than the Americans, or that English mechanics show more refinement either of taste or workmanship than our own. Indeed, our observation inclines us to a very different opinion. If refinement of mechanical taste has anything to do with grace of form, proper distribution of material, strength without clumsiness, and grace without meretricious ornamentation, we believe American mechanics are not surpassed. In fact, English machinery of every description appears clumsy where it should be only strong, and the material is wasted to make a show of strength where this grand element would exist without this waste. So in the form or shape of the machine or its parts, the show of strength with cumbrousness seems to be considered by English mechanics as better than the reality with grace of form. If this is a refined mechanical taste our English cousins are welcome to it; but where real strength, power, availability, and utility can be united to gracefulness of form and proper proportions, we prefer the sort of mechanical taste that is competent to produce it, and that we believe the works of our American mechanics fully prove they do possess.

THE CULTURE DEMANDED BY THE AGE.

The report of a lecture by the Hon. Frederick De Peyster, LL.D., delivered before the Alumni Association of Columbia College, on the evening of the 9th inst., as given in the New York *Tribune* of the 10th inst., either does that gentleman great injustice or else we are compelled to avow, that in our humble opinion the subject was very superficially treated. That report represents the lecturer as stating that there are two opinions prevalent in regard to the object of education; the first being that it should be the acquisition of useful knowledge, the second, that its end should be solely mental discipline. Those who entertain the former opinion, according to Dr. De Peyster, maintain that a study of the natural sciences is best calculated to promote the desired result; those who believe in mental discipline advocate the languages and mathematics.

Dr. De Peyster may be fairly presumed—being a learned man lecturing to the alumni of a college of high rank—as referring to opinions of learned and thoughtful men upon the subject of education. It is scarcely supposable that he alludes to the crude views of those who have scarcely nothing of either mental discipline or useful knowledge. Taking it for granted then, that the views of men whose opinions are valuable are referred to, we respectfully submit that both sides are misrepresented in this statement.

We claim to have read something of those opinions, and to be not altogether ignorant of the past and present status of the educational question, and we have never heard or read anywhere an expressed opinion that either the attainment of useful knowledge or mental discipline should be made the sole end of a course of study. A fair statement of the matter is that the advocates of a more scientific course of training regard both objects as of about equal importance, while those who cling to the old system of classical and mathematical study, consider mental discipline as of paramount importance. The latter view is only correct upon the supposition that one must be sacrificed to obtain the other. The scientific school of educators maintain that such a supposition is absurd, that both can be combined, and can be obtained together as well if not better than if either object were pursued separately, and they are right.

The analogies between mental and physical development are very striking, and in discussing this subject, Dr. De Peyster enunciated a principle which is the strongest argument in favor of combining acquisition of useful knowledge with discipline.

"Physical education as a means is not to be neglected, but careful observation had shown that where mere muscular training was sought as an end it was less successfully attained than when the bodily exercise was conducted in connection with some other end, either of amusement or useful labor to be attained by it."

Can the mind be educated as advantageously by a course of exercise avowedly for discipline and for no other object, as when "*some other end*" is to be attained by it? We do not hesitate to answer: no. And we appeal to the experience of

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instructors throughout the civilized world to substantiate the correctness of our view. But they must be men who have tried both methods or their testimony will not be admissible.

But let us see what is the opinion of the lecturer himself upon the object of study; he has an opinion, which, according to the report referred to, is thus stated:

"It appeared to him that the true object of education or culture was the development of all the powers and capacities of the individual in such a manner as to best enable him to promote the happiness and usefulness of himself and others."

This is delightfully clear and definite. We can now understand exactly what is wanted. It is "development of the powers of the individual" (so far all right) "in such a manner as to," etc. Now what sticks us is the expression "such a manner." That is all that educators have been writing and talking about for years, simply *the manner*.

Leaving the questions at issue upon the subject of education entirely undecided, the lecturer proceeded to prescribe a course of study that should be best adapted to the development of all the powers and capacities of the individual in a manner which is so clearly characterized by the pronominal adjective "such". Here we suppose that a child shall have learned to read at least short sentences in its native tongue before it enters upon the first studies of the prescribed course, namely Astronomy, Chemistry, and Geology. Such rudiments of language would seem to be required in order to make satisfactory progress even in these light branches of study. Having mastered these easy, and to the minds of children, most entertaining and captivating studies, the child is recommended to mount the hill of science by the following stepping stones in the order here specified. Natural History, Botany, Compound Chemistry (whatever that may be), Physiology, Moral Philosophy, Psychology, and Sociology, at which time it will be found profitable to commence the mathematics and the study of languages. Astronomy first and language last, and this course is recommended as the natural order; the "proceeding from the simple to the complex."

We feel sure that the report has misrepresented the Doctor's views, as it is inconceivable to us that a man who can write Hon. before his name and LL.D. after it, should have been so bold as to expose himself to criticism by the public enunciation of views so crude and impracticable as he is represented to have done.

THE FULTON FERRY ACCIDENT--THE DUTIES OF PASSENGERS.

On the 14th of November, a collision occurred between two boats of the Fulton Ferry, plying between New York and Brooklyn, by which one person was killed and a number wounded, some of them dangerously and others fatally. From what we can learn, and from what we know personally, we cannot attribute the occurrence to carelessness nor want of skill on the part of the employés of the Ferry Company. It appears to have been an unavoidable accident, such as might occur under circumstances of the greatest care and precaution; indeed, it is strange that such accidents are not more frequent especially when all the facts are considered.

The estuary separating the two cities is thronged with craft of all descriptions at every hour in the day. Those insects of our commercial marine, the tug boats, are forever flitting hither and thither, sometimes rushing along alone at a speed almost approaching that of a race-horse, and again laboriously and slowly tugging away at an unwieldy raft of canal boats or barges, or a big ship like a helpless giant in the power of a vivacious dwarf. These, perpetually crossing the path of the ferry boats, render navigation across the strait difficult in the most favorable seasons. Added to these difficulties is the fact that the tide in the East River is of tremendous power, to be likened to nothing more appropriate than a rapidly-running, broad river.

Under such circumstances it is no wonder that the *Hamilton*, delayed and hampered by a tug and her convoy, should be diverted from her course, and especially as the tug swung around, closing the entrance to the slip just as the ferry boat was about to enter. In consequence she came in collision with the boat in dock, and being depressed forward by the crowd of impatient passengers, her guards passed under those of the lighter boat, which tore away the slender framework of the cabin and crushed the people into a mass of writhing and helpless humanity.

Undoubtedly, the lamentable results of this accident might have been greatly mitigated if not altogether prevented but for the insane practice of crowding the forward part of the boat. However crowded one of these ferry boats may be, two minutes suffice to land all the passengers, and it is well-known that no position or condition is so unfavorable to steering a vessel as when she is "down by the head." Even those who are content in these short transits to sit in the cabins or stand aft, no sooner hear the engineer's signal for stopping or backing, as the boat approaches the bridge at the inner end of the slip, than there is a general rush forward to the extreme bow, just at the time, too when the steersman has most difficulty in managing the wheel. These being the facts, the observant man will wonder, not that an accident does sometimes take place, but that such occurences are not frequent, and he will admire the skill of the pilot which under these adverse circumstances is able thousands of times to bring his valuable freight safely across the channel without injury.

The nonsense of the engine standing on the center, which has been suggested by some in connection with this accident, is too puerile to merit serious contradiction. Every engineer, especially every one who understands the construction of the ferry boat engines, and knows the skill of their engineers, will scoff at such a statement given as the cause for the collision.

It is estimated that forty millions of people cross the waters of New York on the various ferry boats that ply between the city and points on the opposite shores. Few, comparatively, are ever injured, and generally where injury is sustained it results from a disregard of the rules of the company. The safety of this system of transit may challenge comparison with that of any other in existence—we should say that more than one hundred persons are either killed or wounded every year in the Central Park, a thing which rarely ever occurs in any Park or public drive in Europe—yet our newspapers are comparatively silent upon the subject beyond the bare mention of the facts. We do not justify carelessness on the part of corporations, and we believe in holding them to a strict account, but it is sometimes impossible to avoid casualty. "Accidents happen in the best of families," hence we see no reason for the outcry raised by a portion of the press against the Ferry Company, and especially the inhuman proposition that the regular pilot should be arraigned for manslaughter. There is wanton wickedness in raising such a hue and cry against a poor man who has to support himself and family upon the wages of his trade.

The verdict of the coroners' jury in the case of the young man, Brewer, killed by the accident, entirely exonerates the Ferry Company and its employés from blame. It is as follows: "The death of George Brewer was caused by a collision of the ferry boats *Hamilton* and *Union* on the 14th of November, 1868, at the Fulton Ferry, New York; the said collision being the result of the excess of passengers on board the *Hamilton*, thereby rendering her in a great measure unmanageable in such a state of the tide."

ARE METEORS AND FALLING STONES IDENTICAL?

A meteor so large, and moving at so great an altitude that it was seen both in England and France was observed on the night of the 7th of October. The occurrence having drawn forth an expression of opinion from a celebrated French Observer upon the identity of meteors with the so-called "stones" which have fallen from time to time upon the surface of the earth is worthy of attention. A full account of the event, and a conversation held between a contributor to *Le Petit Journal*, Paris, and M. Chapelas-Coulvier-Gravier the observer referred to, we copy from the *Mechanic's Magazine*, of October 23d.:

"A very remarkable meteor was seen at Wimbledon on the night of the 17th inst., about ten minutes before twelve o'clock. It consisted of a red ball, emitting bright sparks, and exhibiting a flaming tail of great length, illuminating the earth with great brilliancy, much as a flash of vivid lightning might do. The color of the light was bluish. The sky was perfectly clear at the time, and the moon was shining brightly, but the light of the meteor, which lasted for several seconds, completely overpowered that of the moon, and cast actual shadows on the ground. This phenomenon appears to have been observed at Paris also. It is thus spoken of by 'Galignani' in Friday's issue:—An extraordinary meteor passed over Paris the night before last, about ten minutes to twelve, and inundated the city with a bluish light like that of electricity. The luminous globe proceeded from the south to the star Alpha in the constellation of Cepheus towards the north of the star Gamma of the Little Bear. Its size was about that of the moon, and just before its bursting, which was marked by a loud report, assumed the form of an immense cone. We learn from the local journals that it was also seen at Havre and Rouen. But the most graphic account of this visitor is given by a writer in '*Le Petit Journal*' of the 8th instant, and of whose article we give the following translation: Yesterday, about midnight, the late retirers of Paris were witnesses of one of those magnificent phenomena of which we often read. We refer to those celestial bodies that approach very near us, and to which we give the name of meteors. We have long known that these bodies are strangers to the earth, that they come from space, and when they thus approach it near enough in their rapid transit through the atmosphere, their friction against the air is sufficient to heat them, or melt, or inflame, or even volatilize them, so that on departing they leave behind them a long train of luminosity, analogous to that of an enormous fusee, and shedding a vivid light which has often been compared to that of the moon. In such of these bodies as have fallen on the face of the earth we find no foreign substances. The luminous train, or "sillage," enables us to know the direction of their movement in a very exact manner. Thus we ascertain that they move in a direction nearly horizontal, that they have a velocity of twenty or thirty kilometers per second, or 1,000 times greater speed than an express train. It is a velocity only comparable with the movements of celestial bodies. When they explode and burst into a shower of stones, it is with a noise analogous to that of a cannon or a peal of thunder. The stones are projected over a surface often larger than that of Paris. The number of these stones perhaps is many thousands, and their weight is often considerable.

"To see these bodies well the night is necessary, but they are to be seen all hours of the day and all periods of the year. To cite examples this year. On the 30th of January last, at seven o'clock in the evening, in the environs of Varsovie, a globe of fire was seen of the apparent magnitude of the moon. It left behind it a pale train of light; the luminosity surpassed that of the moon, and it passed successively in color from a bluish green to deep red. The velocity was about fifty kilometers per second. After two extremely loud explosions it terminated in a series of smaller ones, comparable only to the fire of a file of well trained soldiers, and a whistling was heard, owing to the rapid transit of the stones in the air. These stones were distributed on a surface of about sixteen square kilogrammes; their number was many thousands.

"On February 29, about half-past ten in the morning, there was heard in several localities of the arrondissement of Cassale, Piedmont, a loud detonation, which could only compare with the discharge of a piece of artillery, or the explosion of a mine. It was followed by many other detonations resembling the rattling of distant musketry. While these disturbances were lasting, at a considerable hight, a mass of irregular form was seen enveloped in smoke. At the same instant, a shower of grains of sand and of stones fell on the ground, but only a small number of fragments were found, the greater part having penetrated the earth at a great depth, more or less owing to their great velocity in striking the ground.

"Since the memorable inquiry of Biot in 1803 on the shower of stones at l'Aigle, Orne, the observation of all these meteors following the shower of stones does not confirm the exactness of the details furnished by that illustrious observer. Now, the description of all the phenomena of that nature is in some way based on the theories of Biot. In order to have the precise information, relating to the late meteor, from the Luxembourg, I went to the court of the palace, and took the right hand staircase, and soon arrived at the top—one step more and I was in the roof story.

"M. Chapelas-Coulvier-Gravier, if you please?—He is here.

"M. Chapelas was accordingly gracious enough to be put to my interrogation.

"You have undoubtedly seen the meteor of yesterday; you, who are always on the watch for these things?—Assuredly.

"Will you give me the details of such?—Very willingly. It was a meteor of first grandeur.

"Was it then, much larger than the apparent disk of the moon?—Oh, dear no. It was only as large as my fist!

"But M. Elysée Peraire, who saw it, told me it had the apparent size of many moons, and Gaborian believed his house on fire?—The effect of the dazzling light. The light is so great, and the contrast so violent with the obscurity of the night, that the body appears incomparably larger than it really is.

"Have you heard any detonation?—Not more this time than at others.

"However, my cousin Bernard told me that he had heard two deafening reports, as those of a distant cannon?—Another illusion. I never have heard any thing of the kind.

"You singularly upset my ideas, or, rather, the universally accepted notions on the subject?—I agree with you in that.

"Have you seen enough to be able to affirm so much of them?—This is my 377th observation.

"But perhaps they have never passed near enough to you to be enabled to hear the reports?—I have been as near as possible.

"Then you ought to have heard some sounds, or, in a word, have had some *debris* of them?—Never.

"Oh, but you joke?—Me! not at all. I do not deny that there have been showers of stones; but I have never proved the phenomenen during the pretended fall of a meteor. I have read descriptions describing the explosion of a meteor and the descent of showers of stones. I have always seen the meteors continue their course, and have not seen them descend.

"Do you believe, then, that those you saw were reduced to gas in the atmosphere, while others were at a luminescent temperature?—I do not know; only I consider the meteors and the showers of stones are distinct phenomena.

"This is beyond the subject?—I tell you what I have seen only; I don't pretend to estimate their velocity, nor their hight or movement.

"Yes, but this was the reverse; the number approximate has been given?—This is, again, much unauthenticated. It has not been ascertained.

"Enough for to-day. I am afraid of too much influence from your theories. *Au revoir* and thank you."

THE METEORIC SHOWER was observed at a great many different points throughout the United States. The accounts received seem to vary in the general direction of the meteors, but many agree in the description of peculiar appearances of the trails left after the disappearance of the bodies themselves, something like what a long smoke wreath might be supposed to present when acted upon by currents of air. In this city a peculiar figure formed by one of these trails was seen to the south, described by some as shaped like a letter S, and by others as a figure 5. The shower took place principally upon the night of the 14th, and as the weather was particularly fine, we suppose that this general display of natural fireworks was witnessed by an unusually large number of observers.

THE *Moniteur Meridional* describes the mode that is adopted on a large scale for preserving the eggs required for consumption in Paris. Into a caldron of boiling water a colander containing a dozen eggs is plunged, and kept in it during a minute. This short immersion coagulates a thin layer of albumen, which, attached to the interior of the shell, constitutes an impermeable lining.

CENTER OF GRAVITY IN A VERTICAL REVOLVING WHEEL—We are in receipt of a letter from J. McCarroll, upon the above subject. Having given both sides of this question a fair hearing, and expressed unmistakably our own opinions upon the subject, we shall drop the matter, as the continuance of a valueless discussion is not to our taste nor that of our readers.

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THE DENTISTS AND THE HARD RUBBER CONTROVERSY.

This case (Goodyear vs. Rust), which has excited a great deal of interest on the part of the dental profession, has just been decided by Judge Shipman, at the United States Circuit Court, Hartford, Conn.

OPINION.

This is a motion for a preliminary injunction founded upon the well known Nelson Goodyear patent for vulcanizing rubber and other similar gums. The validity of this patent has been so often sustained by adjudications that no question will be considered in deciding the present motion except that of infringement. The bill of complaint in this case is supported by affidavits, which clearly entitle the complainants to the injunction prayed for, unless the respondent's proofs overcome or avoid their effect. The respondent works under the patent of Edward L. Simpson, and uses the compound made in accordance with the process described in that patent. The complainants allege that this process is clearly within the scope of Goodyear's invention as described in his patent, and is therefore an infringement of their rights. This is denied by the respondent, and the question, so far as it is necessary for the determination of this motive, is now to be decided.

Avoiding all useless rehearsal of the details of this Goodyear patent, and of the repeated litigations to which that patent has been subjected, it may be briefly stated that the process covered by it is secured by mixing about four ounces of sulphur and one pound of rubber, and subjecting this mixture to not less than 260° to 275° of heat, Fahrenheit scale. This under proper conditions of place, and time, produces the compound or substance known as vulcanite, a material now well known in the mechanic arts. The vital question involved in the present controversy relates to the proportion of sulphur and rubber, and the degree of heat. Does the Simpson process substantially embrace these proportions, and this degree of heat? If it does, then it is an infringement of the complainants rights.

The respondent denies that the Simpson process does embrace all these proportions as effective agents or active forces in accomplishing the work of vulcanization. In support of this denial he has adduced affidavits of distinguished chemists who give a delineation of the elements which enter into Simpson's mixture, and produce his vulcanite. It will be sufficient in this place to refer to the affidavit of Professor Seeley, as that contains all the materials of the defence to this motion.

Prof. Seeley says that the substances used by Simpson in the preparation of his hard rubber are sulphur, gum benzoin, oil, and common rubber; and his manner of using these substances, as set forth in his patent, is as follows: He mixes two ounces of benzoin with sixteen ounces of sulphur, and to sixteen ounces of this mixture he adds one quart of linseed oil. This mixture of sulphur, benzoin, and oil is then subjected to the proper degree of heat, and the result is the substance which he calls his vulcanizing compound. To make hard rubber, or vulcanite, he takes from ten to fourteen ounces of this compound and one pound of rubber, and thoroughly mixes them by grinding between warm rolls. He then subjects this mixture of rubber and vulcanizing compound to a heat of 320° Fah. The result is a vulcanite.

Without rehearsing the details of the analysis presented by Prof. Seely, it may be stated that the quantity of this compound which is necessary to perfectly vulcanize one pound of rubber, contains, in some form, not much less (to use the language of Goodyear's specification) than four ounces of sulphur. In other words, this amount of sulphur goes into this quantity of the compound and forms one of its original elements. About half of this sulphur chemically combines with the oil and forms what Prof. Seely calls vulcanized oil, and the other half exists in the mass of vulcanized oil in the form of free sulphur. Vulcanized oil alone, when mixed with rubber will not vulcanize the latter, according to the evidence before me. Prof. Seely says: "The effect of vulcanized oil on mixing and heating with rubber is not at all chemical. The rubber does not in any chemical sense become vulcanized. Whatever advantage there be in the use of vulcanized oil with rubber must be wholly due to physical and molecular causes, and cannot be accounted for on any theory of vulcanization based on Goodyear's processes. A quantity of vulcanized oil containing four, or even sixteen ounces of sulphur, may be mixed and heated with one pound of rubber, and not an atom of Goodyear's hard rubber can be produced."

He then goes on to say: "Simpson's compound is composed of vulcanized oil and free sulphur. When the compound is rolled and heated with rubber, the free sulphur no doubt acts upon the rubber with its full efficiency; and in estimating the vulcanizing or hardening properties of the compound, the value of the free sulphur, if any, must be conceded. It is therefore necessary to compute the amount of free sulphur in Simpson's compound."

This computation he then proceeds to make and the result is as I have stated—one-half of the sulphur is combined with the oil (chemically) and the other half remains free—or, as Professor Silliman expresses it, is "entangled in the mass of this compound." Professor Seely says of this compound, "The free or effective sulphur is exactly one-half of the whole content of sulphur."

What part of the benizon plays in the compound does not appear from the evidence. But I gathered from Simpson's specification that "its vaporizing qualities more perfectly expel the fumes of the sulphur as well as the odor from the oil, and render the compound nearly, if not perfectly odorless." In the performance of this office it may be an improvement on Goodyear's process.

It is conceded then, what vulcanized oil (oil and sulphur chemically combined), will not produce, when mixed with rubber and heated, vulcanite. There is no proof that the benzoin renders the vulcanized oil any more effective as a vulcanizing agent. It is equally conceded by the respondent's evidence that the quantity of free sulphur in Simpson's compound, cannot alone vulcanize. It is asserted that the vulcanized oil and the free sulphur scattered through it does successfully vulcanize, whenever the mass of compound applied to one pound of rubber contains in the whole not much less than four ounces of sulphur in all, free and combined. Such a proportion of the mass to the pound of rubber is necessary to comply with the conditions of Simpson's patent.

We have then Goodyear's invention, which consists in combining not much less than four ounces of sulphur with one pound of rubber, and submitting the same to not much less than from 260° to 275° of heat, Fahrenheit scale.

We have Simpson's process, which consists of combining not much less than four ounces of sulphur with one pound of rubber, and subjecting the same to a heat of 320°, Fahrenheit scale.

The distinction which is sought to be made between these two compositions or processes is founded upon the claim that in Simpson's one-half of the sulphur is first chemically combined with oil, forming a new substance termed vulcanized oil, which there, though acting in the same mass with the remaining half of the sulphur as an auxiliary vulcanizing agent, acts in a different way from the free sulphur itself. In other words, half the quantity of sulphur necessary to vulcanize under Goodyear's process has disappeared and exists no longer except as it is represented in a new chemical substance called vulcanized oil. The other half remains. But neither the half that remains nor any quantity of the new agent can alone vulcanize. Yet the two, acting together, at once perform this important office and produce the same result as Goodyear's combination.

I have said that it appears from the evidence that the *chemically combined* elements of the compound of Simpson alone will not produce, when mixed and heated with rubber, vulcanite. I infer this from the language already cited from Professor Seely's affidavit where he says "A quantity of vulcanized oil containing four, or even sixteen ounces of sulphur, may be mixed and heated with one pound of rubber, and not an atom of Goodyear's hard rubber can be produced. Simpson's compound is composed of vulcanized oil and free sulphur." I have not failed to notice that the language is that the vulcanized oil in combination with the rubber will not produce 'an atom of *Goodyear's* hard rubber." But as the whole scope and direction of the defense are aimed at establishing a distinction between the *processes* and not between the *products*, I can come to no other conclusion than that the compound alone, if destitute of free sulphur, would not, when mixed with rubber, perform the office of vulcanization. It is true that the compound, when made according to the patent of Simpson, always contains one-half of the sulphur in a free state,—but it is agreed on all hands that this amount of free sulphur alone will not vulcanize. So the evidence in whatever light we view it, proves that that portion of the compound which contains the elements in chemical combination is powerless without the aid of the uncombined free sulphur, which is scattered through the pores of the combined mass.

Now it may be asked, how do these two agents, viz., vulcanized oil and free sulphur, by their united forces perform the work of vulcanization? No part of this work is assigned by the evidence to the benzoin. It cannot be done by the chemically combined oil and sulphur alone. It cannot be done by the free sulphur alone. The latter to the extent of its effective power, for all that appears in this case, works in the same way that it does in Goodyear's process. The effect of the former (oil and sulphur chemically combined) Prof. Seely says is not chemical, but "must be due wholly to physical and molecular causes." But whether the auxiliary vulcanizing force, whatever it is, exerted by the chemically combined oil and sulphur, is supplied by the latter or not, does not appear by the proof. From what has long been known, however, of the vulcanizing power of sulphur, when mixed and heated with rubber, that agent, though combined with another substance, would naturally be looked to as the seat of this force.

It may be true that, as Professor Seely says, the effect of vulcanized oil in hardening rubber is not due to chemical but "to physical and molecular causes." Of the nature or significance of this distinction in the scientific sense I do not presume to speak. But I do not see how this fact avoids Goodyear's patent. I do not find in his specification any evidence that he rested his invention upon any such nice scientific distinction, or that he limited his claim to sulphur when working, through chemical, as distinguished from "physical or molecular" laws. If the validity of his patent rests upon such a scientific problem as this, I think its solution should, in the present case, be left to final hearing. The suggestion of such a problem, in *ex parte* affidavits, at a very late stage of a series of protracted litigations in which every other defense has thus far failed, is not a valid answer to this motion.

There can be no question but Simpson uses a degree of heat within the scope of Goodyear's patent.

Let an injunction issue.

For the complainants, C. T. Blake, and Hubbard and Hyde. For the respondents, S. D. Law, and H. T. Blake.

The Right to Use Sewing Machines.

UNITED STATES CIRCUIT COURT.—Gordon Mackay against Benjamin Wolff.—The plaintiff in this suit is the inventor and patentee of a machine for sewing the soles of shoes to the "uppers," an invention from which it is said he has made during the last five years the enormous sum of $35,000,000. The machines are sold only on condition that the persons using them shall put upon each pair of shoes manufactured by them a stamp purchased of the inventor. The case came up on a motion of the plaintiff for an injunction to restrain the defendant from using the machine on the ground of a breach of the contract in the matter of putting stamps upon each pair of shoes manufactured. The case has already been argued in New York upon two similar motions which were dismissed. The case was fully argued and the decision reserved.

We find the above item in a Brooklyn paper. We knew that the sewing machine folks were all rich, but we do not believe that Mackay has made so many millions out of his patent. It is simply ridiculous.

OFFICIAL REPORT OF PATENTS AND CLAIMS

Issued by the United States Patent Office,

FOR THE WEEK ENDING NOVEMBER 17, 1868.

Reported Officially for the Scientific American.

PATENTS ARE GRANTED FOR SEVENTEEN YEARS, the following being a schedule of fees:—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Reissue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

In addition to which there are some small revenue-stamp taxes. Residents of Canada and Nova Scotia pay $500 on application.

☞ *Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required, and much other information useful to Inventors, may be had gratis by addressing MUNN & CO., Publishers of the Scientific American, New York.*

84,045.—DEVICE FOR RAISING AND ADJUSTING WICKS IN LAMPS.—Joseph Bell Alexander, Washington, D. C.

I claim, 1st, The making of the rack, with the guides, H and H', and the stops, L and L', by striking it up of one piece of sheet metal, substantially as described and for the purpose set forth.

2d, The combination with any lamp, of the imperforate wick tube, A, the sliding wick holder, B, the rack, C, the pinion, D, and the bow spring, S, when arranged together substantially as described and for the purpose set forth.

84,046.—DEVICE FOR SAW CARRIAGES.—Levi Black and Milton Gaffney, Logan, Ohio.

We claim adjustable plates, a and b, holders, F and H, sliding stop or clamp, E, and plate, D, herein described, constructed, combined, and arranged to operate in the manner and for the purpose set forth.

84,047.—WATER WHEEL.—J. H. Bodine and T. A. Hill, Mount Morris, N. Y.

We claim, 1st, The arrangement of the top feed vertical discharge wheel, B, in connection with the flanges a a, upon the lower edge of a curb, which has the gate at its top, its side walls being water tight, substantially as and for the purpose herein set forth.

2d, The gate, I, when cast with recesses or concaves, e e, on its under surface, substantially as specified.

3 The arrangement of wheel, B, gate, I, arm, v, screw shaft, T, block, R, working upon the screw shaft and spindle, S, operating the screw shaft by means of cog gearing, W, when said parts are constructed to operate in connection with each other, in the manner and for the purposes above described.

84,048.—PORTABLE FORGE.—John B. Bolinger (assignor to himself and L. R. Firch), Detroit, Mich.

I claim, 1st, The pulleys, o and q, formed of rubber, with metallic faces or peripheries, substantially as described, in combination with the pulleys C and p.

2d, In combination with a portable fan blast forge, the air chamber, S, the double lever, D, and the slotted arm, F, operating in the crank, G, all constructed and arranged substantially as and for the purposes described.

84,049.—CAR COUPLING.—John H. Chadwick, Bristol, assignor to himself and George B. Peck, Warren, R. I.

I claim the arrangement and combination with the arms, b c, and part or abutment, m, with the lever, D, the draw bar chamber, B, and its mouth, C, substantially as described, the whole being to operate in manner and for the purpose specified, with a connection bar, E, made as set forth.

84,050.—WASHING MACHINE.—Wesley Cornell and Thomas L. Blakely, Buchanan, Mich.

We claim, 1st, The eccentric cams, K, adjustable ways, G, and guide blocks, M, when constructed substantially as set forth.

2d, In combination with all the above named parts, the box, A, slide bars, C, rollers, E, and rubber board, L, all operating substantially as specified.

84,051. — HARVESTER. — Alexander G. Donnelly, Bridesport, N. Y.

I claim the wheel, D, constructed and operating as herein described and for the purposes set forth.

84,052.—BEE HIVE.—Benjamin Douthett, Pittsburg, Pa.

I claim a hive for bees, having all of the herein described characteristics, that is to say, a box divided on a vertical line, so as to form two equal and distinct parts, A A, and with an india rubber packing, T, between the two, each part or half of the hive being provided with a horizontal partition, E, inclined bottom and perforated plate, F, and a wire gauze, m, extending from the partition to the bottom, and a narrow horizontal box, P, beneath the hive, open at both ends, and provided at each end with a metallic curtain, N, as a passage way, common to each half of the hive; the whole being constructed, arranged, combined, and operating substantially as and for the purposes hereinbefore set forth.

84,053.—MANUFACTURE OF IRON AND STEEL.—Francis Ellershausen, Ellershause, and Augustus E. Stayner, Halifax, Nova Scotia, and Adolph Guzman, New York city.

We claim, 1st, As a new article of manufacture, pig bloom or pig scrap, being a conglomerate of cast iron, oxides, wrought iron, and particles of matter more or less nearly approaching one or other of those substances produced by admixing, and bringing in contact with fluid cast iron, oxidizing substances in a solid state, in such a manner and in such quantity as to produce a solid condition of the mass.

2d, The mixing of cast iron with an oxidizing agent, one or other of which is rendered fluid by heat applied previously to such mixing.

3d, The production of wrought iron from cast iron, by mixing with the latter, while fluid, a sufficient amount of oxidizing material to produce a solid condition of the mass.

4th, The production of wrought iron from oxides of iron, by mixing the latter with molten cast iron to such an extent as to produce a solid conglomerate of the two.

5th, The employment of detersive agents and useful alloys, by mingling them, or either of them, with the oxides used in the process hereinbefore described, so that they shall become part of the conglomerate, and have such intimate contact and connection with the mass as to produce their proper chemical effects when it is afterwards subjected to the action of heat.

84,054.—STEAM ENGINE SLIDE VALVE.—John S. Everitt and Ossian Cook, Oshkosh, Wis.

We claim, 1st, The valve boles, S S, of the valve, H, with lugs, r r, constructed and arranged relatively to the cams, n n, arms, m m, provided with slots, x x, and the valve stem, C, as a means of adjustment in compensating for wear of valves and valve seats.

2d, The valve case, A A, when constructed substantially as described, and arranged relatively to the slide balance valve, H, as herein set forth.

3d, The arrangement of the hollow balance slide valve, H, throttle valve, F, with the valve case, A A, injection and ejection pipes, I I', supply pipe, K, and exhaust pipe, K', substantially as herein set forth.

84,055.—SUSPENDING CLAMP.—Dan. P. Foster, Waltham, assignor to himself and N. M. Lowe, Boston, Mass.

I claim a suspending clamp, formed of two segment cams, B B', pivoted to the supporting frame, A, and connected by a link, C, substantially as described and for the purpose set forth.

84,056.—POTATO DIGGER. — Hamilton France, Hinmansville, N. Y.

I claim, 1st, The geared wheel, E, shaft, F, pinion, G, and arms, H in connection with the axle, A, frames, C and I, connecting rods, J, for the purpose of giving a vertical vibratory motion to the grate, K, substantially as herein described.

2d, The frames, C and I, hinged together at their front ends, in connection with the axle, A, and lever, Z, when constructed and operating substantially as herein specified.

3d, The bar, N, arms, R and U, lever, Q, fulcrum, S, and pin, T, in connection with guides and standards, O, axle, P, and tongue, V, when combined, arranged and operating substantially as and for the purposes herein described.

4th, The combination of the above named parts with the wheels, B and X, bails, M, and seat, Y, when constructed, arranged and operating substantially as herein set forth and shown.

84,057.—CHUCK.—Charles F. Hadley, Chicopee, Mass., assignor to Clifford Arrick, Belmont county, Ohio.

I claim, 1st, The arrangement of the adjustable nut, E, bevel gear, F, divided ring, G, and securing pins, h h, or their equivalents, constructed substantially as described and for the purpose set forth.

2d, The arrangement of the adjustable nut, E, bevel gear, F, divided ring, G, annular groove, d, and securing pins, h h, or their equivalents, in combination with the bevel pinions, D, constructed and operated substantially as and for the purpose set forth.

84,058.—WASHING MACHINE.—Mortimer S. Harsha (assignor to himself and Edwin Meredeth), Batavia, Ill.

I claim the combination of the bars, F F, pivoted at their centers to the frame, B, the two rollers, D D, having bearings in in opposite ends of said oscillating bars, F F, the roller, C, arranged beneath and between said rollers, D D, and the cam wheels, A A, all arranged and operating so as to give the rollers, D D, a rotating, a longitudinal, and an oscillating motion with respect to the roller, C, substantially as herein shown and set forth.

84,059.—TWEER.—Adam Herbig (assignor to himself and Thomas Blackburn), Corry, Pa.

I claim the circular duck's nest, A, provided with the inlet pipe, d, and the outlet pipe, d', placed opposite each other, and with the damper, c, all arranged and operating substantially as described.

84,060.—WATCH ESCAPEMENT.—Julius Hietel, John Wenzel Hietel, and John Loomis Geissler, Philadelphia, Pa.

We claim, 1st, The described construction of the self-regulating lever, C, for watch escapements, consisting of the arm, b, fitting around the staff, D, and provided with a shoulder, e, against which rests the end of the shorter arm, d, said arms being connected by the spring, f, as herein set forth.

2d, The combination and arrangement in a watch escapement of the balance wheel, A, spring lever, C, partly flattened or grooved staff, D, pallets, F, banking pin, h, and ruby pin, a, all made and operating substantially as herein shown and described.

84,061.—REIN HOLDER.—Isaac Hull, Stamford, Conn., assignor to himself and J. Ferguson Morsell.

I claim a device for holding driving reins, composed of the clamp, A, and spring, B, constructed and operating substantially as herein specified.

84,062.—METALLIC FENCE.—Michael Kelly (assignor to himself, William Lalor, and James Slammon), New York city.

I claim the construction of thorny fence by fixing the thorns, B, in holes in the wire, A, in the manner and for the purposes herein set forth.

84,063.—HAY CUTTER.—Henry Kinsey, F. W. Kissell, J. E. Smith, and J. M. Smith, Ligonier, Pa.

We claim, 1st, The knives, H, constructed and operating substantially as herein shown and described, and for the purpose set forth.

2d, The combination and arrangement of the double crank, f', of the shaft, F, bent pitman, J, and vertical sliding rod or bar, I, having arms, 11 12, formed upon it, with each other and with the slotted knives, H, substantially as herein shown and described, and for the purpose set forth.

3d, The combination and arrangement of the ratchet wheels, L, sliding pawls, P, short arms, Q, rock shaft, R, long arm, S, and pitman, T, with each other and with the feed rollers, K L, and sliding rod or bar, I, for the purpose of operating the said feed roller from the said sliding bar, I, substantially as herein shown and described.

84,064.—VALVE FOR STEAM ENGINES.—Ralph R. Lee, and George H. Wren (assignors to themselves and John C. Northall) Mahanoy city, Pa.

We claim, 1st, The main valve, C, constructed substantially as herein shown and described.

2d, The combination of the valve, C, with the stationary heads, F G, of the steam chest, substantially as herein shown and described.

3d, The arrangement of the valve, C, and heads, F G, with relation to the steam ports, p, substantially as herein shown and described.

84,065.—REEL FOR GRAIN BINDERS.—Sylvanus D. Locke, Janesville, Wis.

I claim the combination of the reel, A, spring, D, and brake, E, either with or without the pins, I, or with or without the cylinder, B, substantially as and for the purpose set forth.

84,066.—CAR COUPLING.—James Osman, and John F. Potter, Linden Hall, Pa.

We claim the pivoted plate, I, having the guides, e e, or their equivalent, when employed in connection with a draw head, substantially in the manner and for the purposes described.

84,067.—ANTI-FRICTION WASHER. — U. H. Reed, Jeremy Lake, and Luther Sisson North Easton, Mass.

We claim the combination of the parts, A B, and D, and the spherical balls, substantially as and for the purpose described.

84,068.—WINDOW SHUTTER.—Frank A. Reiher, Cincinnati, Ohio, assignor to Frank A. Reiher and Company.

I claim the arrangement of the two series of lipped or flanged slats, I II III IV, 1' II' III' IV', racks, D D', pinions, E, and guiding grooves, 1 2 3 4 1' 2' 3' 4', substantially as set forth.

84,069.—SPRING BED BOTTOM.—Gustavus Reneky, and Samuel Kiess, Edgerton, Ohio.

We claim the arrangement herein described, of the longitudinal slats, A, blocks, C, transverse slats, B D G, double looped springs, E, grooved and slotted blocks, F, metallic loops, I, and straps, H, as and for the purpose specified.

84,070.—MACHINE FOR SEPARATING THE PULP FROM FIBROUS SUBSTANCES.—Gelston Sanford, Bergen Point, N. J., assignor to the Mallory and Sanford Flax and Hemp Machine Dressing Company, New York city.

I claim, 1st, The holding planks, F, suspended vertically upon each side of the rotary scraper disk, when the feed openings therein are arranged above the horizontal plane of the axis of said disk, as herein described, for the purpose specified.

2d, The vertical holding planks, F, suspended above the disk, A, free from contact with the combs, E, and adapted to be operated by the cam levers, G, to press the material to be operated upon against the radial combs from opposite sides, as herein shown and described.

3d, The described arrangement of the rotating disk, A, the radial combs, E, upon opposite sides of said disk, the suspended planks, F, having the feed openings and the spouts, I, the side rails, H, and cam levers, G, all operating as described, for the purpose specified.

84,071.—HARNESS TREE PAD.—William A. Sharp, and John A. Shannon, Tama city, Iowa.

We claim the pad, F, made heart shaped, or triangular, to increase its bearing surface parallel with the animal's back, and having formed upon its outer and small end the loop, G, for the passage of the tug buckle strap, whose upper end is secured by a rivet passing through the hole, H, and also provided with the twolngs, C, between which the tenon of the terret is secured by the bolt, E, all arranged and operating as described, for the purpose specified.

84,072.—VENTING METALLIC CORES.—Amos Shepard (assignor to "Union Manufacturing Company," New Britain, Conn.

I claim venting the interior surface of the molten metal which comes in contact with the solid metal by means of grooves, d, formed in the solid metal, substantially as described, and for the purpose herein specified.

84,073.—CLOTH DRAWERS.—H. P. Wetmore, Elizabeth, N. J., and J. G. Hirckcock, New York city.

We claim, as a new article of manufacture, cloth drawers, formed in pieces A and B, having the joining seam extended across the back of the leg, at or near the knee joint, substantially as and for the purposes herein set forth.

84,074.—MACHINE FOR SPREADING PAINT OR MASTIC.—John W. Wheeler, Cleveland, Ohio, assignor to H. H. Wheeler, New York

I claim, 1st, The spreader or roller, B, in combination with the apron, E, and rollers, F F', when operating conjointly and reversely in relation to each other, for the purpose specified.

2d, The guards, J, springs, K, as arranged, in combination with the apron, E, and in relation to the frame, A, and spreader, B, in the manner as and for the purpose set forth.

84,075. — CORN PLANTER.— Lorenzo D. Wyatt, Castleton, Ind., assignor to himself, Samuel Farley, and Edward McManama.

I claim the arrangement, A B C D E F, and G, and the agitator, N, all arranged and operating substantially as described, for that purpose.

84,076. — PAPER BAG MACHINE. — Christopher Amazeen, New York city.

I claim, 1st, The arrangement of the knives, G and H, with the collars, I I, and the spring forwarders, J J, substantially as and for the purposes herein set forth.

2d, The arrangement of the cog wheel, u', on the main shaft, h, and gear wheels, v' v', secured in slots to the frame, A, so that the former may be changed, and the latter are movable, for the purpose of adapting the machine to making bags of different sizes, substantially as herein set forth.

3d, The bag former, K, constructed as described, in combination with the pressing roller, d', for the purpose of forming the bag, and pressing down the pasted side of the same, substantially as herein set forth.

4th, The arrangement of the rollers, r and w, one placed under the rear end of the bag former K, and the other under the pressing roller, d', the rubber carriers, p p, and the rollers, b' b', which latter are provided with rings to hold the carriers in proper position, and constructed as described, and operating substantially as and for the purposes herein set forth.

84,077. — THILL COUPLING. — William Wallace Anderson, Camden, N. J.

I claim the steel spring, b, in combination with the segments or arches, d and E, which bear upon the shaft pin, g, but do not touch each other, and with the screw bolt, a, the whole arranged and operated substantially as and for the purpose herein set forth.

84,078.—SAFETY APPARATUS FOR LAMPS.—Cephas Applebee, Lyndon, Vt.

I claim my improved arrangement of the air pipe, d', with the annular body, A, and its series, d, of gas discharging holes.

Also, the combination and arrangement of the neck, c, and the male and female connection screws, a b, with the annular body, A, the air entrance tube, d', and the gas eductors or series, d, of discharging holes, arranged in such body, as hereinbefore specified.

84,079.—FLUE CLEANER FOR BOILERS.—William C. Baker, New York city.

I claim the tube scraper, constructed and arranged as specified, so as to form a partition for directing the products of combustion, except during the operation of scraping the tubes, as specified.

84,080.—CHECK HOOK FOR HARNESS.—Charles H. Bassett, Derby, Conn.

I claim the arrangement of the conical headed spindle, F, through the bolt or base of the hook, and provided with a spring, arranged within the body of the bolt and spindle, so as to operate in the manner herein set forth.

84,081.—DEBRIS CHECK FOR PUMPS.—Sanford O. Blanding, Smithfield, R. I.

I claim a debris check or strainer, c, water charging pipes, D E, and air chamber, A, arranged and combined substantially as described, for the purposes specified.

83,082.—WAIST BELT.—Almena R. Boylson, Chicago, Ill.

I claim a metallic belt supporter, made in sections, with an elastic or flexible piece, b, interposed between the sections, a, substantially as and for the purposes specified.

84,083.—CATAMENIAL SAC.—George E. Brinckerhoff, Brooklyn, N. Y.

I claim a catamenial sac, with four elastic straps, two of which are longer than the other two, and all attached to the sac, so that the latter may be adjusted on the body of the wearer in such manner that it will not interfere with the performing of the ordinary functions of nature, substantially as shown and described.

84,084 —HORSE HAY FORK.—J. H. Brinton, Thornbury, Pa.

I claim, 1st, The use of an adjustable ball or other enlargement upon the operating rope of a hay elevator, for automatically unloading the same, substantially as herein set forth.

2d, The combination of the adjustable ball, H, with an arm, F, jointed to one of the jaws of a hay elevator, connected to the other by a cord, h, and having an opening, e, for the passage of the operating rope, the whole being constructed, arranged, and operating substantially as and for the purpose described.

84,085.—HORSE RAKE.—Henry L. Brown, Adrian, Mich.

I claim the segmental gears G and K, lever, L, quadrant, M, stop, N, and spring, O, substantially as herein described, and for the purposes specified.

84,086.—ROLLING MILL.—William Brown, Smethwick, Eng.

I claim, 1st, The combination and arrangement in rolling machinery such as described of two sets of rolls, having parallel axles, the one set consisting of two rolls, and the other of three rolls, driven at different speeds, substantially in the manner and for the purposes herein set forth.

2d, In conjunction with two sets of billeting or reducing rolls, the one consisting of two and the other of three rolls, driven at different speeds, and combined as herein specified, the arrangement of the flattening and edging grooves formed in said rolls, as described and shown, for preventing the necessity for turning the bar on passing from one set to another.

84,087.—HAY SPREADER.—J. M. Burdick, Ilion, N. Y.

I claim, 1st, The combination and arrangement of the tedder teeth, F F,

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bars, E E, with cranks, H H, and revolving ring, I, constructed and arranged to operate substantially as described.

2d, In combination with the teeth, F F, the loop, b, and clamp, a, for fastening said teeth upon the bars, E E, substantially as described.

3d. In combination with the tedding devices above claimed, hinging the shafts to the main frame, A, and making their direction, relatively to said frame, adjustable, by means of the link, M, rock shaft, N, and hand lever, O, to raise and lower the tedder frame as required, substantially as described.

84,088.—SASH SUPPORTER.—ROBERT M. Campbell, Cambridgeport, Mass.

I claim the within-described sash-sopporter and lock, consisting of the plate, C, with its friction roll, D, in combination with the screw, E, and a projection, c, locking the sash when closed, operating substantially as described.

84,089.—HEAT RADIATOR.—William B. Choate, Galt, Canada West.

I claim, 1st In combination with a radiator of serpentine form, the method of placing the flanges, d and f, on the end plates, substantially as shown and described.

2d, Depressing the flue of the radiator after the curves or turns, so as to form a series of diving flues, substantially as and for the purpose set forth.

84,090.—HORSE RAKE.—Lyman Clinton, North Haven, Conn.

I claim the combination and arrangement of the two treadles, D E, with the axle, A, the one fixed directly to the axle, and both in relative position to each other, so as to be operated in the manner specified.

84,091.—MACHINERY FOR FOLDING AND CORDING THE EDGE of Paper.—John E. Coffin, Portland, Me.

I claim, 1st, The creasing rolls, c d, chutes, b b', of guards, pasting disks, 1 2 3, grooved as shown, pressing roll, m, and finishing rolls, p q, all arranged and combined substantially as and for the purposes set forth.

2d, The pasting disks, 1 2 3, provided with grooved edges to receive the cord, c' substantially as shown.

84,092.—MEANS FOR SECURING SPRINGS TO SLATS OF BED-Bottoms.—Z. S. Cracraft, Lacon, Ill.

I claim securing the semi-elliptic spring, b, to the slat, d, by means of the coupling piece, e, provided with the bent lips, e' e', passing through slots in the slats, substantially as described.

84,093.—SASH FASTENER.—William J. DeGrummond, Cincinnati, Ohio.

I claim the series of springs marked, F or F', and the pieces, D or D', or the equivalent of said devices, in combination with the catch, E, and the series of cavities or notches, K, as and for the purposes described.

84,094.—CORN PLOW.—Thomas Dillon, Highland, Ohio.

I claim, 1st, The tenoned plow-beam, E, pivoted in the beam, A, and provided with a bent arm, F, by which it is adjusted at any hight desired, substantially as herein set forth.

2d, The curved plow blade, H, provided with an ear or lug, I, for the purpose of attaching it to the plow beam, E, substantially as herein set forth.

84,095.—ATTACHING HANDLES TO CROSS-CUT SAWS.—Samuel Disston, Philadelphia, Pa.

I claim the socket, B, forming a part of the slotted stem, b, and having an internal screw thread for the end of the handle, D, in combination with the grooved washer, e, and a ferrule, E, having an internal screw thread adapted to a thread on the socket, the whole being constructed and arranged substantially as and for the purposeset forth.

84,096.—COMPOUND FOR TREATING LEATHER.—August Doepp, Newark, N. J.

I claim a compound for treating leather, the chief ingredient of which is oleate of glyceryl, as set forth.

84,097.—PLOW.—V. C. Duclos, New Harmony, Ind.

I claim, 1st, The arrangement of the notched standards, J J, arm, K, and pin, d, for the purpose of regulating the plow, substantially as herein set forth.

2d, The combination of the hounds, C C, hinged beam, F, arm, K, standards, J J, and lever, L, all constructed and operating substantially as and for the purposes herein set forth.

84,098.—SASH FASTENER.—William Edson, Boston, Mass.

I claim the segment wedge, F, horn, H, and leaf, A, operating in combination with the plate, B, substantially as described and for the purpose set forth.

84,099.—TAKE-UP FOR SEWING MACHINE.—John V. D. Eldredge, Detroit. Mich.

I claim the combination and arrangement of the needle bar, F, provided with pin, G, face plate, B, provided with slot, I, take-up spring, E, and spring lever, A, with the curve, H, and projection, D, all constructed as described and shown.

84,100.—POST DRIVER.—Joseph Ellenberger, Easton, Ohio.

Antedated Nov. 13, 1868.

I claim the arrangement of the adjustable guides, K K, grooved weight, R, slotted beam, H, pulley, g, cord, f, and windlass, I, with the frame constructed as specified, with its various parts, for operating as herein set forth,

84,101.—SHIELDING ARCHES FOR EVAPORATING KETTLES.—James English, Syracuse, N. Y.

I claim the combination of the enclosing shield, C, with the cogs, a a, in the ends of the sections forming the joint, the whole arranged as described, and operating in the manner and for the purpose specified.

84,102.—WASHING MACHING.—Caroline F. Fleming, Belleville, Ill. Antedated Oct. 28, 1868.

I claim the roller, B, when formed of the sector pieces, b, and combined with tee shaft, C, by the washer plates, c, substantially as set forth.

84,103.—CANDLE CAP.—James H. Foote, Pittsfield, Mass.

I claim, a candle cap, a, when provided with an annular flange rest, b, in the form and manner described, as a new article of manufacture.

84,104.—HYDRANT.—Charles E. Frazier, Baltimore, Md.

I claim, 1st, The cap or top, B C, constructed and operated in the manner substantially as shown and described, and for the purpose set forth.

2d, The combination of the hollow screw H, and the valve stem I, arranged, constructed, and operated in the manner substantially as shown and described, and forthe purpose set forth.

3d, The combination of chamber, F, screw, H, rod, I, and hollow pis on b, arranged, constructed and operated in the manner substantially as sho n and described, and for the purpose set forth.

84,105.—THRESHING MACHINE.—Peter Geiser, and Daniel Geiser, Waynesborough, Pa.

We claim, 1st, A threshing machine and separator, combining in its construction, the following elements, viz, on adjustable feed board, a cylinder and concave, two sets of reciprocating rakes, and a series of spur wheels and intermediate pinions for driving both rakes from the fan shaft, substantially as set forth.

2d, The combination of the fan shaft, the two sets of reciprocating rakes and the pinions, U2 X X1 X2 and X3, and arm, with wrists supporting the intermediate pinions, X and X2, substantially as set forth.

3d, The arrangement of the shields in relation to the gearing for driving the rakes, substantially as and for the purpose set forth.

4th, In combination with the reciprocating rakes, the intermediate notched bars, the slides and guides, the cranks, and the system of driving gearing, substantially as set forth.

5th, So arranging the parts of the driving mechanism, that the motion of the several parts shall be communicated from one to another at a regularly reduced speed from the cylinder to which the power is first applied, substantially in the manner set forth.

6th, The cast shoe, side plates with pivot or joint bearings, shelf or apron recesses, adjustable slide board, flanges, and with notched recesses to receive the second roller shaft, substantially as set forth.

7th, The shoe, when constructed with combined metallic and wooden sides, and so arranged in relation to the case of the separator, that blasts of air may pass between the shoe and the case, substantially as and for the purpose set forth.

8th, In combination with the fixed register plates, the oscillating inner plates V1, counected by a tie, V2, and having one side loaded so as to open the register by gravity, and a regulating weight attached to the hook, V3, said parts being so arranged in relation to the blast as to operate substantially as and for the purpose set forth.

9th, The dividing apron, O, in combination with the graduating rib, O2, substantially as and for the purpose set forth.

10th, The chaff board, g, for separating the tailings and the chaff, when constructed and arranged so as to be applicable, also, for the purpose of closing the rear end of the winnower, substantially as set forth.

84,106.—ROTARY PUMP.—Charles V. Genung, Duquoin, Ill.

I claim, 1st, The hollow cylindrical piston, A, having the slotted V-formed projection, V, when used in combination with the follower, B, and vane, C, as herein specified,.

2d, The hollow piston, A, provided with the opening, H, forming an eduction passage, substantially as described.

3d, The vane, C, having an enlarged head, forming the follower, B, as specified, as arranged in relation to the trip, D, and valve, E, as herein described and for the purpose specified.

84,107.—SASH LOCK.—Joseph U. Gerow, Brooklyn, N. Y.

I claim the arrangement and construction of the slotted and suspended plate, A, to which is attached the projecting fastener, D, with the weighted handles, C', in combination with the cam, B, and lock-plate or case, E, as shown and described.

84,108.—PROPELLER FOR CANAL BOATS.—Samuel D. Gilson, Oswego Falls, N. Y.

I claim, 1st, The canal boat, with pairs of shafts, a a, carrying propellers, B, of small diameter, and applied on each side of the center of the boat, at its stern, upon said shafts, which are all on the same or nearly the same horizontal plane, and driven substantially as described.

2d, The combination and arrangement of two small steam boilers, depressed engine, and boiler room, E, and shafts, a a, with small propellers, B, in pairs, on each side of the center of the boat, substantially in the manner and for the purposes described.

84,109.—MAGAZINE STOVE.—James Gray, Albany, N. Y.

I claim, 1st, In a base burning stove, having a fuel magazine suspended free from the grate, and having an unobstructed free space around and below it, and having an illuminated casing surrounding the same, the construction of descending flues, N N, passing from the brim of the fire-pot, C, and outside the base, A', and near the front of the stove, in combination with ascending flues, L and O, chamber, R, and descending flue, T", substantially as shown and described.

2d, The construction of hooded chute, I, with a flue opening, T, upon the top thereof, for the purpose of causing the products of combustion from flue, O, to pass through the said hooded chute on their passage to exit flue, M, substantially as and for the purposes set forth.

3d, The combination of the intermediate air chamber, J, the descending flues, N N, the annular flue, K, and the ascending flue, L, substantially as shown and described.

4th, The combination of combustion chamber, E, flue, O, and hooded chute I, with its top flue opening, T, substantially as herein set forth.

5th, The revolving cover or valve, Q, in combination with the coal reservoir, H, and the hooded chute, I, substantially as and for the purposes herein set forth.

6th, In a coal stove or furnace, having a depressed fire pot and a supplying reservoir sustained free from the grate and fire pot, and so arranged that the inflamed gases may burn in a free space, so constructing and arranging such stove or furnace that a portion of the products of combustion arising from the fire will be conducted up, around, and above the reservoir, H, and hooded chute, I, to the top of the stove, and at the same time another portion of said products of combustion will be carried down outside the fire pot, C, to and around the bottom of the stove, thereby producing an equal degree of heat over the entire surface of the stove, substantially in the manner herein described.

84,110.—HYDROCARBON BURNER.—John Gray, San Francisco, Cal.

I claim the above described adjustable burner, consisting of the cylinder, B, plug, E, adjusting stem, D, and openings, a a, constructed and arranged substantially as described.

84,111.—WRENCH.—A. C. Greth, Reading, Pa.

I claim, 1st, The roller, B, moving in the slides, e e, when applied to the jaw of a wrench in the manner described, for the purpose set forth.

2d, The shell or case of substantially the described construction, when carrying the roller, B, and fitted to be placed over the jaw of an ordinary monkey or key wrench, in effect as and for the purpose set forth.

84,112.—GAS AND STEAM FITTINGS.—Albert Hallowell, Lowell, Mass.

I claim the mold or molds constructed and arranged substantially as described, for the purpose of forming finished fittings or parts of fittings, as and for the purpose specified.

84,113.—ROASTING IRON ORES BY WASTE GASES.—Alexander Hamar, New York city.

I claim the combination, as set forth, with the kiln, of the open top for charging the raw ore, the open bottom for discharging the roasted ores, the flue encircling the roasting chamber and communicating with it by the slits, d, and a fan for forcing in the heated waste gases escaping from the blast furnace.

84,114.—MACHINE FOR FORMING TIN-LINED LEAD PIPE.—A. Hamon, Paris, France.

I claim the combination and arrangement of the sliding cross head, F', vertically slotted nuts and screws, f H, or their equivalents, and pillars, C C', for the purpose of adjusting the die, e, to the mouth of the mold, in the manner described.

2d, The combination and arrangement of the lifting apparatus, consisting of a cylinder, G, and the parts thereto attached, with the slotted nuts and screws, H f, or their equivalents, and pillars, C C', for the purpose of confining, releasing and moving the cross head, F', at the times specified and for the purposes set forth.

84,115.—WASHING MACHINE.—Wm. S. Harrison, Germantown, Tenn.

I claim the frame, F, hinged at one end of the stationary tub, and provided with levers, G, connecting the board, A, and with an adjustable lever for operating, the interior board, B, with slotted arms, m, all as herein shown and described.

84,116.—PADDING OR STUFFING FOR HARNESS.—Henry Hauer, Philadelphia, Pa.

I claim the stuffing of collars, saddles, and other parts of harness, with granulated cork, combined with a gum elastic or other equivalent cement as and for the purpose herein set forth.

84,117.—DRYING KILN.—B. R. Hawley, Normal, Ill.

I claim, 1st, The dry house or kiln, A, when provided with an inlet, b, surrounding the fire box, at or near the base of the house, and with the heating chamber, B', which is to be so arranged as to conduct the heated air to the top of the building, and the upcast shafts or chimneys, D, when the latter are arranged to take the vitiated or spent air from the bottoms of the chambers, A', substantially as described and for the purpose shown.

2d, The fire box, B, the smoke tubes, C, and the hot air chambers, b and B', when constructed and employed as and for the purpose set forth.

84,118.—CHAIR.—David B. Hedden, Newark, N. J. Antedated Nov. 5, 1868.

I claim, 1st. The seat, C, constructed with one or more pins, d, and the holes, E, with the plugs, F, substantially as and for the purposes set forth.

2d, In combination with the said seat, the legs, A B, constructed and secured as described.

3d, In combination with the said seat, the back, G, constructed and secured in the manner described.

84,119.—COMPOSITION ROOFING.—Clement F. Hinman, Chicago, Ill.

I claim a roofing composition composed of coal tar, clay (or other similar suitable substance), glycerin, and dissolved india rubber, either with or without animal oil, substantially as and for the purposes specified.

84,120.—ROOFING COMPOUND.—Dwight Hitchcock, Syracuse, N. Y.

I claim a roofing compound composed of the within ingredients, in about the proportions mentioned.

84,121.—SEEDING MACHINE AND CULTIVATOR COMBINED.—Sidney S. Hogle, Berea, Ohio.

I claim, 1st, The revolving cultivators, E, as arranged in combination with the jointed frame, A, for the purpose and in the manner substantially as set forth.

2d, The combination of the revolving cultivators, E, and rollers, B B', in the manner as and for the purpose specified.

2d, The combination of the revolving cultivator, E, rollers, B B', and seeding boxes, substantially as and for the purposes specified.

4th, The special construction and arrangement of the drill box, A', when operated in the manner as and in combination with the cultivators, E, and rollers, B B', for the purpose described.

5th, The slotted standards, I', revolving cutters or disks, F', in combination with the box, D, in the manner as and for the purpose set forth.

6th, The windings, wings, or ribs, d, as arranged in combination with wings c, and roller, I, for the purpose set forth.

7th, The combination of the toothed wheels, K, rollers, B B', agitator, I, and chain, J, for the purpose specified.

84,122.—CAN OPENER.—Guy C. Humphries, Washington, D.C.

I claim the bearing block, C, hinged or pivoted to the knife, A A, substantially as and for the purpose set forth and described.

84,123.—DIFFERENTIAL GEAR ELEVATOR.—Daniel Hussey, Nashua, N. H.

I claim the combination of the racks, c c, pinions, d d, internal gears, j and and differential gear, k, when constructed and operating substantially as and for the purposes described.

84,124.—IRON WINDOW SHUTTER.—Benj. A. Jenkins, La Crosse, Wis.

I claim, 1st, Metal slats, a, which, in transverse section, are of a form very similar to the letter U inverted, the leaves of each slat being pressed together, so as to leave an air space between them and form an eye just below the arch of the U, to receive and confine the pivot on which the slat is hung all as herein described and shown.

2d, As a new article of manufacture, the metal window shutter, with its hinged sides, made of U iron, and its closing sides of a similar shaped iron, lapping at the closing edges, said shutter having its slats double, and pivoted to the arch of the U iron, and also having its bar, which adjusts the slats, made of U iron, and connected to the slats by iron brackets, all as described.

3d, The arranged of the U sheet metal hinging facing strips, G G, in combination with the double slats and U metal frame, all in the manner described and shown.

4th, The pins, c, carrying slats, a, with bent ends, in combination with the retaining strip, b, as herein described.

84,125.—LEMON SQUEEZER.—John Klepzig, San Francisco, Cal.

I claim the movable button, E, with its opening, H, the spiral spring, F, in combination with the two levers, A and B, operating substantially as and for the purpose specified.

84,126.—CASTER.—Charles Lewando, Boston, Mass.

I claim in a ball caster, the concaved friction rollers, D D' D", said rollers running on inclined axles, made substantially as described and for the purpose set forth.

84,127.—ELEVAROR.—Wm. Louden, Cedar township, Iowa.

I claim, 1st, The within described arrangement of the bar, N, for suspending the track or railway, A, substantially as set forth.

2d, The manner of attaching the pulley, E, to the track or railway, A, substantially as shown and described.

3d, The adjustable stop, P, when provided wtih a projecting pin or hook, around which the hoisting rope is fastened, substantially as shown.

4th, The lever, L, so arranged and operated that it can be used both as a latch and as a brake, substantially as shown and set forth.

5th, The combination of the levers, L L', having a flexible or sliding connection, substantially as and for the purpose set forth.

6th, The levers, L L', having a flexible connection, in combination with a weight for producing, and a stop, F, for releasing the pressure on the hoisting rope, substantially as and for the purpose set forth.

7th, So arranging the latching apparatus that the hoisting rope will pass by instead of through it or around it, and the latch be released by one edge of the plate, S, coming in contact with it, substantially as set forth.

8th, The guide or keeper, K, for the purpose specified.

84,128.—WOMB SUPPORTER.—John Magoffin, St. Louis, Mo.

I claim, 1st, The instrument herein described, consisting of the curved rods, A B, having their forward ends provided with the plate, b, and claws, a', and pivoted together by means of the pin, a, substantially in the manner and for the purpose described and set forth.

2d, The instrument, A B, in combination with the external supporter, C, as described and shown.

3d, The arrangement of the adjusting screw, D, by pivoting it to the rod, B, and sliding it in a slot in the end of the rod, A, as described and set forth.

84,129.—SCRUBBING BRUSH AND MOP.—Jabez F. Mason, Brooklyn, N. Y.

I claim, 1st, A handle attachment for a scrubbing brush formed of the ring c, flange, i, stem, e, and screw, in combination with the plate, b, and thumb screw, g, substantially as and for the purposes specified.

2d, The nop frame on the stem, e, in combination with said handle attachment for a scrubbing brush, substantially as specified.

84,130.—COFFIN.—Silas Merrick, New Brighton, Pa.

I claim in the construction of coffins, burial cases or caskets, the sheet metal bottom, A, the angle iron, B, the sheet metal side and end plates, C C, the strip of wood, D, the rubber packing, E, in combination with the cast metal top, F, arranged substantially as and for the purposes herein described and set forth.

84,131.—MANUFACTURE OF LAMPBLACK.—Adolph Millochau, New York city, assignor to himself, Jules Marcelin, Louis A. Geyer, and Edwin D. Barnes.

I claim the use of lampblack as a porous material, to supply oil to the flame in the manufacture of lampblack.

84,132.—STEAM DEVICE FOR WASHING BUILDINGS.—Charles Nivert, Paris, France.

I claim the combination of the injectors, A A, their delivery pipes, t, tank, C, communicating through pipes, a a, with the injectors, and steam generators, G, communicating with the injectors through pipes, d, the whole being arranged and constructed as herein set forth.

84,133.—DROPPER FOR HARVESTERS.—A. L. Peters and G. M. Peters, Lancaster, Ohio.

We claim, 1st, A dumping platform, which is adapted to be swung or vibrated, in the arc of a circle, to a position behind the frame, for discharging the gavel, while at the same time it preserves its parallelism with the finger bar.

2d, The tilting or dumping platform, in combination with means for operating the same, whereby said platform is adapted to be swung to a position behind the main frame, and there tilted upon a pivot or hinge parallel with the platform and at right angles to the path of the machine, as set forth.

3d, The parallel arms or links, C C', or their equivalent, for supporting and operating the platform, as described.

4th, The combination of the parallel arms or links, platform bar, and tilting platform, hinged or pivoted thereto.

5th, The retaining teeth, in combination with the platform bar and tilting platform.

6th, The arrangement of the fulcrum of the cut-off in rear of the cutting apparatus, and above the same, so that said cut-off in being operated to intercept the falling grain, shall be moved downward and forward in the arc of a circle, the center of which is in rear of and below said cut off, as described.

7th, The inclined way or cam on the heel of the shoe or drag bar, for raising the platform as it is swung to the rear of the frame for the discharge of the gavel, substantially as described.

8th, The angular extension of the platform arm C', or its equivalent, operating in combination with the platform, substantially as described.

9th, The forked lever, or its equivalent, for operating the cut-off, in combination with the vibrating cam or cam rod on the platform arm, C', or platform, substantially as described.

10th, The combination of the swinging and tilting platform cut-off, and means for operating the same, substantially as described.

84,134.—APPARATUS FOR EVAPORATING CANE JUICE.—S. A. Poché, St. James Parish, La.

I claim the boiler, A, when constructed substantially as described, and combined with a set of sugar kettles, as and for the purpose set forth.

84,135.—LUBRICATOR.—Wm. M. Rennyson, Pottsville, Pa.

I claim the combination of the reservoir, A, neck, B, shoulder, a, rubber gasket, C, and strap, D, all constructed and operating substantially as and for the purposes herein set forth.

84,136.—DITCHING MACHINE.—Leonard Rickard, Danville, Ill.

I claim the arrangement of the point, I, mold boards, H H and B B, adjustable wings, D D, and braces, C C, all constructed and operating, substantially as herein set forth.

84,137.—REEFING FORE-AND-AFT SAILS.—William C. Rogers, Newark, N. J.

I claim the combination and arrangement of the pinion, K, endless screw, L, and crank, M, attached to the upper side of the jaws, P, and operating the roller at its inner end, as herein described and for the purposes set forth.

84,138.—HARVESTER REEL.—John L. Rohrer, Upper Leacock, Pa.

I claim, 1st, The rake, F, arranged upon the beater of a harvesting machine and adjustable thereon, so that its teeth may be projected beyond or withdrawn from the edge of the beater, substantially as and for the purpose described.

2d, The revolving beaters or blades, D, and their adjustable rakes, F, in combination with a pin, i, arranged eccentric to the axis round which the blades revolve, and connected to the rakes, substantially as and for the purpose specified.

94,139.—FRUIT BOX.—James S. Shields, Medora, Ind.

I claim, 1st, A box or crate, having its ends secured therein by means of cleats on the end pieces and grooves on the sides, top, and bottom of the box, substantially as shown and for the purpose described.

2d, In combination with the ends of the box the secret springs, F, substantially as shown and described.

84,140.—SHOEMAKER'S SHAVE.—J. Y. Simons, Troy, N. Y.

I claim, 1st, The combination of the bars, B and C, and lugs, I I, the knife, D, cap, G, and screw, A, substantially as and to the effect hereinbefore set forth.

2d, The formation of the handle, A, in such a manner as to give space for the fingers below them, and with downward projections at their ends, substantially as set forth.

84,141.—APPARATUS FOR RAISING FENCES.—Thomas J. Smith, Jackson, Mich.

I claim the combination with the lever of a carriage jack of a hook, H, substantially as and for the purpose described.

84,142.—WRENCH.—William S. Smoot, Washington, D. C.

I claim a wrench, constructed with a head, A, handle, B, and sliding jaw, C, when arranged substantially as and for the purpose set forth.

84,143.—FIRE PROOF COMPOUND.—Robert Spencer, New York city.

I claim a fire proof molding compound or paint, composed of the within-described ingredients, mixed together in about the proportions set forth.

84,144.—LEVER POWER FOR SEWING AND KNITTING MACHINES.—Greenleaf Stackpole, New York city.

I claim, 1st, The application to the sewing machine and knitting machine, of an auxiliary lever power, consisting of the friction wheel, E, or its equivalent, when used to produce continuous motion by the alternate application of friction to its opposite sides, substantially as and for the purposes set forth.

2d, The cord, I, frame, j, and thumb nut, L, substantially as and for the purpose set forth.

3d, The brake, P, as and for the purpose set forth.

84,145.—LOG CART.—John Stitt, St. Johns, Mich.

I claim, 1st, The arm, E, cast with hollow axle, F, when constructed and operating substantially as herein described.

2d, The weighted lever, T, pawl, S, and rachet wheel, R, in combination with windlass, O, rope, M, block, N, and chain, U, when arranged and operating substantially as described.

3d, The combination of the above-mentioned parts with the cross ties, H, hounds, I, pole, J, braces, K, hook, L, bearing, Q, evener, X, and connecting rods, Y, operating substantially as herein described.

84,146.—SCRUBBING MACHINE.—Worden E. Stoddard, Fort Edward, N. Y.

I claim, 1st, The arrangement of the hollow shaft, D, pinion, F, cog wheel, G, shaft, H, crank, J, bottom, B, and crossbar E, all substantially as and for the purposes herein set forth.

2d, The combination of the hollow shaft, D, and stationary collar, M, with the movable collar, N, plate, O, arms, P P, rods R R, collar, S, arm, T, and screw, V, all arranged and operating substantially as and for the purposes herein set forth.

3d, The arrangement of the hollow shaft D, provided with a slot, a, and the rod b, substantially as and for the purposes herein set forth.

4th, The combination of the hollow shaft, D, and tub A, with a circular brush, scourer, or dryer, when arranged and operating substantially as and for the purposes herein set forth.

84,147.—EXTENSION LOUNGE.—Charles Streit, Indianapolis, Ind.

I claim the slats, B, attached to the movable front rail, A, movable pieces I and J, and to the strip, C, in combination with the slats, E, attached to the strip F, and the slats, D, attached to the front and rear rails of the principal frame, when constructed and arranged to operate substantially as herein described.

84,148.—HYDROCARBON BURNER.—Edward W. Taylor, Norristown, Pa.

I claim, 1st, The improved process of producing in intensity, and at small expense, heat and other effects of combustion by burning petroleum and other liquid and liquescent fuel on the surface of an open plate, surmounted and combined with an incombustible covering, without the intervention of sand or other materials, the combustion being facilitated and the effects intensified by the employment of a current of steam passing into the fire chamber, substantially as shown and described.

2d, The blast apparatus assisting in said process, being the arrangement described, of the air passage, D, in combination with the steam receptacle, E, arranged to move up and down, and the method of bringing heated steam into union with the air at a point and in a mode as described, so as to form a most intimate union, and at the same time creating a powerful blast, conveying the mixture into combination with the burning fuel.

3d, The combination of a fuel plate with a blast apparatus, assisting in the combustion of liquid and liquescent fuel, substantially as shown and described.

4th, The slide, P, as a device for the purpose of accommodating hydrocarbon burners to fire-boxes and other spaces of varying sizes, without requiring the burners in such cases to be constructed on different scales.

84,149.—HOOP SKIRT.—William H. Towers, Boston, Mass.

I claim, as a new article of manufacture, a hoop skirt, consisting of the bustle hoops, a a, flounce hoops, b b, and suspending wires, D D, arranged substantially as herein described.

84,150.—FIELD ROLLER.—Wesley Westfall, Chelsea, Mich.

I claim the frames, B B B and C C C, when constructed as described, and secured by the pins, F, to bear the rollers, A' A", all arranged, constructed, and operating as described as shown.

84,151.—HARVESTER.—Cyrenus Wheeler, Jr., Auburn, N. Y.

I claim, 1st, A main frame having a tubular projection on one side, for supporting the bevel wheel shaft, in combination with an axle for the driving wheel, bolted to the other side, substantially as described.

2d, A main frame, having a tubular projection on one side, for supporting the bevel wheel shaft, in combination with an adjustable axle on the other side, for receiving the driving wheel, substantially as and for the purposes described.

3d, In combination with a main frame and an adjustable crank frame, an adjustable axle, as and for the purposes set forth.

4th, In combination with a main frame, an adjustable crank frame, an adjustable tongue frame, and an adjustable axle, substantially as set forth.

5th, So uniting the platform with the finger bar as to compensate for the sag of the platform or its tendency to spring or bend when in use in reaping.

84,152.—RAILWAY RAIL COUPLING.—John T. Wilson, Pittsburg, Pa., assignor to himself, Frank Rahm, and Thomas J. Louis, same place.

I claim strengthening the joints between contiguous rails by means of the chairs, c, and the inclined wrought iron splice piece, E, having horizontal flanges, d, struck up upon it, and connected together and supporting the ends of said rails, in the manner and for the purpose described.

Also, in combination with the chairs, splice piece, and ends, of joint between the rails, the joint plate, F, held to the base of the rails, and to the splice piece, substantially as and for the purpose described.

84,153.—BURGLAR ALARM.—Herman John Wolters, Chester, Mass.

I claim, 1st, The combination, with the horizontal sliding rods, t, for actuating the bar, s, of the upright posts, a', and their pointers, c', moving in slots formed in the case, A, and arranged, with relation to the numerical figures or letters attached to the said case, as herein shown and specified.

2d, The combination, with the vibrating bar, s, operated by the rods, t, as described, and the tripper, m, to which said bar is attached, of the vibrating match carrier, and its actuating spring, arranged to operate in connection with the friction plate, k, and lamp, a, as herein shown and specified.

3d, The herein-described construction and arrangement of the friction

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plate superior, h, so that it may be adjusted to any desired distance and angle, with respect to the swinging match carrier, as and for the purposes set forth.

84,154.—GRAPE AND VINE TRELLIS.—T. G. Yeomans, Walworth, N. Y.

I claim the combination with the independent wires, C C', of the lever, B, having openings at different points, whereby said wires are connected thereto, and thereby tightened, and a sliding ring, d, for holding the wires when so tightened, substantially as described.

84,155.—OPEN OR MIDDLE RING.—B.F.Zinn, Mount Rock, Pa.

I claim the oval or circular parts, A A and B B, with the trapezoidal extensions, C and D, and the trapezoidal apertures, C and D, and the rivet or bolt and screw, E, connecting the parts, A A and B B, all combined and operating in the manner and for the purpose herein set forth.

84,156.—REEL.—Elijah Baker, Lorraine, assignor to himself and Augustus L. Baker, Mannsville, N. Y.

I claim the screw, b, nut, D, and hooks, a a, in combination with the arms, A A', by means of which said arms may be secured together or disconnected, for the purpose herein specified.

Also, in combination with the above, the pins, E E' E'' E''', the latter made adjustable by means of the screw, F, substantially as and for the purpose herein shown and described.

84,157.—MODE OF FASTENING STRAPS TO BOOTS.—Peter H. Baker, Virginia City, Nevada.

I claim the plate A, constructed as described, provided upon its outer edges with the long teeth, a, and upon its inner edges, opposite to each other, with the short teeth, a', said plate secured to the boot and strap by inserting the teeth and lapping the outer rows, a, over the inner rows, a', upon each side of the frame, as herein described, for the purpose specified.

84,158.—WATER WHEEL.—Vincent M. Baker, Preston, Minn.

I claim, 1st, The buckets, C, composed of the three parts, a a' b', constructed and arranged as described, to be acted upon by the water, as herein set forth.

2d, The gates, D, composed each of two plates, e f, arranged as shown, and connected to the rim, h, by rods, g, in combination with the tangential plates d, between the rims, A B, all being constructed, arranged, and made to operate substantially in the manner as and for the purpose set forth.

84,159.—DOOR SPRING.—Warren S. Barlow, Paterson, N. J.

I claim the within described combination and arrangement, with a door or blind A, and casement, B, of a spring, C, and stud, D, in such a manner as that the opening of the door or blind shall draw or extend the spring, substantially as herein set forth.

84,160.—AWNING FOR HORSE CARS.—Manfred C. Battey, Washington, D. C.

I claim, 1st, The combination of the pole, A, and hinged arms, B C, with a system of ropes and pulleys capable of folding or expanding said hinged arms, in the manner described.

2d, The arrangement of pole, A, hinged arms, B C, fixed arms, D F, and ropes, G I, substantially as described and shown.

84,161.—SHAFT COUPLING.—A. Bigelow, Hamilton, Canada.

I claim the shells, B B, on shaft, A, in combination with the rings, D, and sockets, F F, which receive the shafts, G G, the rings and sockets being connected together and to the shells respectively by the bolts, E H, with the bolts, E, passing through the bolts, H, all being constructed and arranged substantially as and for the purpose set forth.

84,162.—PADLOCK.—Amos S. Blake, Waterbury, Conn.

I claim the frame, A, provided with the spindle, B, in combination with the cup, C, provided with the catch or bar, D, or its equivalent, and the cone E, attached to the cup, all being constructed and arranged substantially as and for the purpose specified.

84,163.—VELOCIPEDE.—E. K. W. Blake, Chicago, Ill.

I claim, 1st, The combination with the driving axles having the fixed ratchets, C, of the loose pulleys, B, actuating pawls, and propelling belts, the latter passing over guide pulleys at or near the front of the machine, substantially as and for the purpose described.

2d, The combination with the axle of the guiding wheel, of the slotted guide brackets, L, swinging bearings, K, adjustable foot rests, L, and retracting springs, M, all substantially as and for the purpose described.

84,164.—EXTENSION SPOKE.—D. C. Brewster, Kent, Ohio.

I claim the socket, F, tenon, C, screw, D, and thimble nut, E, all constructed and arranged as shown and described, in combination with the spoke, A, and felly, B, substantially as and for the purpose set forth.

84,165.—HOEING MACHINE.—H. C. Briggs, West Auburn, Me.

I claim, 1st, The combination of the cross bars, A and B, longitudinal bars, C. runners, D, curved parts or pieces, G, and plows or hoes, I, with each other, substantially as herein shown and described and for the purpose set forth.

2d, The combination of the inwardly projecting adjustable hoes, J, with the rear ends of the runners, D, substantially as herein shown and described and for the purpose set forth.

3d, The draft irons, H, constructed as desired, in combination with the curved parts, G, of the runners, D, substantially as herein shown and described and for the purpose set forth.

4th. The combination of the adjustable bar or slide, L, with the hinged tongue, K, and front cross bar, A, substantially as herein shown and described and for the purpose set forth.

84,166.—BRUSH.—Amos W. Brown, Lansingburg, N. Y.

I claim as a new article of manufacture, the horse brush having its parts, A A B, connected together by the transverse leather hinges, e e, and by the longitudinal metallic spring, d, covered with strips of veneering, b, as herein described, for the purpose specified.

84,167.—GARDEN ROLLER.—Jas. B. Brown, Peekskill, N. Y.

I claim the combination of the weight, D, and shank, a, with the shaft, B, squared portions, b b, handles, C, and roller, A, as herein shown and described.

84,168.—CONTACT PAD FOR PHOTOGRAPHIC PRINTING.—J. Buchtell, Portland, Oregon.

I claim the use of the elastic pad, a, filled with fluid, air, or gas, and also the eyelets, b, with the attendant screws, together with the diaphragm, e, substantially as set forth and for the purpose described.

84,169.—TANNING PROCESS.—C. J. Bugh, Eau Claire, Wis.

I claim the improved tanning process, substantially as herein shown and described.

84,170.—BRIDLE.—W. F. Clark, Hagaman's Mills, N. Y.

I claim, 1st, The revolving bit, A, having pulleys, a b, and working in the plates, B, substantially as herein described.

2d, The combination of the gag runner, D, rein, C, and martingales, E, with the bit, A B B a b a b, substantially as herein described.

84,171.—SKATE.—W. F. Cornell (assignor to himself and S. Hurlbut), Adrian, Mich. Antedated Nov. 7, 1868.

I claim a skate having the following characteristics: arched brackets, B, sliding ball flanges, M, adjustable sectional heel flanges, E, padded hinged metallic straps, P F, bands, H, with yokes, I, hinged band, K, and hinged ankle support, G, constructed, arranged, and operating as herein represented and described.

84,172.—PAPER FILE.—E. H. Craige, Brooklyn, N. Y.

I claim, 1st, The combination of a base plate, A, having an upright pin or pointed wire, a, with a weight, C, having one or more holes, b, the whole constituting a paper file, substantially as and for the purpose herein shown and described, as a new article of manufacture.

2d, The angular base plate, A B, having a pin or pointed wire, a, in combination with a weight, C, having one or more holes, b, the whole constituting a paper file, substantially as and for the purpose herein shown and described as a new article of manufacture.

84,173.—CORN SHELLER.—Elihu Doud, Oshkosh, Wis.

I claim an outer half cylindrical shell, constructed in segments, d e f, in the manner described, when used in combination with the toothed roller, i, spring S, plate, C, and hopper, C', as and for the purposes described.

84,174.—PROCESS FOR AGEING AND RECTIFYING COPAL VARNISH.—Desso Duduit, New York city.

I claim the process for rectifying and ageing copal varnish, substantially as herein described.

84,175.—STEAM VALVE.—O. P. Dunbar, Norwalk, Ohio, and H. D. Dunbar, Hartland, Vt.

We claim, 1st, The herein described steam valve, consisting of the heads, G, flange, M, ring, N, and nib, a, when constructed substantially as set forth.

2d, The bridge, O, as arranged in relation to the valve, for the purpose specified.

84,176.—PUMPING ENGINE.—C. E. Emery, Brooklyn, N. Y.

I claim, 1st, The combination, with cylinder, A, main piston, J, and the equal heads, M and N, of auxiliary piston, E, of the ports, e f g h, in a valve face operated by E and e' f' g' and h', in the valve seat, when arranged substantially in the manner specified.

2d, The arrangement of the exhaust passages, f' and g', with reference to the ports, B and B', substantially as described, to accomplish the results specified.

3d, The combination of two auxiliary pistons, the first to operate the valve of the second in both directions, without the assistance of tappets, and the second to operate the main valve in the usual manner to accomplish the results specified.

4th, The connection of a moving piston or cylinder with the seat of its slide valve, in such manner that the motion of the piston or cylinder causes the valve seat to follow the initial movement of the valve, and close (and, if necessary, reverse) the ports, and thus bring the moving piston or cylinder to rest, substantially in the manner described to secure the results specified.

5th, The passages, r' and s', so arranged, in combination with r and s, as to admit steam to the auxiliary piston, E, after the valve, P, has moved the desired distance.

6th, The extra exhaust ports, Z Z, when arranged as shown, in the face of the valve, substantially as described.

7th, The particular arrangement of the valve seat piece, Q, with the valve-chamber, R, and the face of the pump cylinder, at w.

84,177.—PERMUTATION LOCK.—William F. Ensign, New York city.

I claim, 1st, The slide, H, bars, J K, with stump, L, attached to the latter, in connection with the bolt-locking mechanism, composed of the bar, O, wheel N, pivoted bolt, P, arm, M, and spring, i, all arranged to operate in connection with the bolt, I, in the manner substantially as and for the purpose set forth.

2d, The step-like projections, k, at the free or disengaged end of bar, K, when used in connection with the wheel, N, for the purpose specified.

3d, The annular plates, R R' R'' R''', provided with the internal annular grooves, connected by passages, g', in connection with the traveler, W, all arranged for operating the tumblers, substantially as set forth.

4th, The toothed rims, T T' T'', in connection with the pinions, e' e', attached to the slides, V V, having springs, f', bearing against them, all arranged in connection with the tumblers, U U' U'', substantially as and for the purpose specified.

5th, The combination of the tumblers, U U' U'', toothed rims, T T' T'', plates R R' R'' R''', traveler, W, and hub, F, all arranged to operate in the manner substantially as and for the purpose set forth.

84,178.—CORN PLANTER.—Snyder Filson and W. E. Kinert, Bluffton, Ind.

We claim, 1st, The movable notched collar, o, provided with arm or arms, k, in combination with the lug, n, on the shaft, a, when operated by means of one of the wheels, M, which is firmly secured to said shaft, substantially as and for the purposes herein set forth.

2d, The cross bar, g, provided with the arms, h and i, in combination with the movable notched collar, o, and arm, k, for the purpose of moving the slides, H H, substantially as herein set forth.

3d, The lever, l, arranged, as described, on top of the box, D, in combination with the bar, m, and movable notched collar, o, for the purpose of throwing said collar in and out of gear with the lug, n, substantially as and for the purpose herein set forth.

84,179.—MILKING PAIL.—R. A. Fish, Worcester, Mass.

I claim the manner of securing the pail while milking by allowing its weight to rest upon its knees on the curved springs, A A. Said springs are made of steel, and tempered, and firmly fastened to the pail, the lower portion of which projects above the rim of the pail, with an aperture in them, through which the bail passes. Said springs can be attached, either in front or rear of the ears of any ordinary pail in use, and can also be fastened to a hoop, and firmly secured to the pail in the usual manner manner of hooping. These springs can also be constructed of iron, or other metal, or of wood, or their equivalents, arranged substantially in the manner described and for the purpose set forth.

84,180.—MODE OF MAKING COMBINED WOOD-AND-WIRE FENCE.—Geo. Fletcher, Sr., Greensburg, Ind.

I claim, 1st, The mode of constructing a wood-and-wire fence, by means of a stationary crab or anchor, U, and a loom, adapted to be drawn over the ground in manner substantially as set forth.

2d, In the described combination, the suspended and detachable batten, R, and notches, S S, as and for the purpose stated.

3d, In this connection, the gage or knife, V, upon the frame, K.

84,181.—DEVICE FOR BENDING SCROLLS.—Edwin Gibbs, Painesville, Ohio.

I claim the finishing-scroll former, B, and the scroll former, A, constructed and combined as and for the purpose set forth.

84,182.—WINDMILL.—Chas. Goodwin, Beardstown, Ill.

I claim, 1st, The arrangement of the vane, F, in an inclined position upon the shaft, D, and operating in connection with the wheel, G, as herein described for the purpose specified.

2d, The arrangement of the wings, H, shafts, i, straight springs, K, and ring d, operating as described for the purpose specified.

84,183.—RAILROAD CAR STOVE.—E. M. Grant, J. B. Van Dyne, and T. R. Pugh, Nashville, Tenn.

We claim, 1st, In combination with the base tank, A, the bottom, b, with its apertures and lids or valves, d, made and arranged in the manner and for the purposes herein set forth and described.

2d, The arrangement of the bottom, b, in the stove, forming, between it and the water line in the tank, the space, C, as shown and for the purposes described.

84,184.—CULTIVATOR.—A. A. Harmon, Olney, Ill.

I claim, 1st, The plows, H H, attached by clevises to the front bar of the diagonally braced open frame, A B D E F, and connected by a cross bar, I, which admits their adjustment as to relative distance, and causes them to swing by a parallel motion as they are deflected laterally, substantially as described.

2d, In combination with the said plows, thus attached and connected, the sliding foot bar, K, arranged as described, and adapted to hold them in elevated position, for the purposes described.

84,185.—AXLE BOX.—E. P. Haskell (assignor to the Hale Patent Washer Co.), New Bedford, Mass.

I claim, for employment with axle boxes, and washers, the hub plate, g, constructed with the internally projecting ring on flange, h, substantially as and for the purpose described.

84,186.—SADDLE.—G. H. Hayden. New Market, Ala.

I claim, 1st, A saddle, provided with a tobacco pipe, A, and a case, C, having a looking glass secured therein, and otherwise arranged substantially as and for the purpose described.

2d, The combination, with the cantle of a saddle, of an adjustable back piece, I, substantially as and for the purpose described.

3d, The back piece, I, provided with the lugs, K, arranged to slide on the rods, L, and with the jointed braces, M, substantially as and for the purpose set forth.

84,187.—METHOD OF ETCHING RELIEF PLATES FOR SURFACE PRINTING.—Charles Henry, Brooklyn, John McLoughlin, Morrisania, and Edmund McLoughlin, New York city.

We claim, 1st, The transforming of etched plates into relief plates, in which the relief lines shall be of the same continuous material as that composing the body of the plates, by the process and in the manner substantially as herein described.

2d, The filling of the etched lines upon the plate with varnish, or other protecting gum or compound, in the manner and for the purpose specified.

3d, As a new article of manufacture, relief plates, of metal or stone, for printing and similar purposes, prepared direct from etching, and in which the raised surfaces shall be of the same continuous material as that composing the body of the plate.

84,188.—STONE-DRILLING MACHINE.—C. W. Hermance, Schuylerville, assignor to W. P. Ostrander, A. H. Pearsall, B. G. Schults, and A. L. Finne, all of the State of New York.

I claim, 1st, The arrangement of one or more flanges or cams, or their equivalents, on the side of a wheel, for the purpose of operating a machine, by raising a certain part thereof and letting it fall again when said flanges or cams operate from the periphery to the axle of the wheel, that is, commence the raising at or near the periphery, letting go near the axle, substantially as herein set forth.

2d, The tube, H, having its sides slotted and notched, as described, in combination with the movable collar, b and pins, e e, for the purpose of compressing the spring, J, thereby regulating the force of the drill operated by said spring, substantially as shown and described.

84,189.—NAIL-CUTTING MACHINE.—Cyrus D. Hunt, Fairhaven, Mass.

I claim the arrangement as well as the combination of the gears, i k, their crank pins, h r, the connecting rods, g p, the arm, f, rocker shaft, e, toothed sectors, c d, shaft, I, toothed sector, H, and gear, G, as applied to the vibratory arm, F, and the tubular shaft, E, the whole being for effecting the vibratory motions of the said arm, and the reciprocating semi-rotary movements of the nail plate carrier, as set forth.

84,190.—TANNING APPARATUS.—S. Hosmer, Concord, Mass.

I claim the combination, with a vessel arranged for tanning *in vacuo*, of an agitating wheel, B, or its equivalent, substantially as and for the purpose described.

84,191.—MACHINE FOR HOLDING THE CUTTERS OF MOWING MACHINES WHILE BEING GROUND.—D. W. Jameson, Warren, Ohio.

I claim, 1st, The flanged rod, C, grooved bar, D, forming the sliding joint, E, as described.

2d, The flanged rod, C, grooved bar, D, in combination with the bar, D', uprights, A', cross bars, B B'', and foot pieces, B', all constructed and arranged to operate as and for the purpose described.

84,192.—PERMUTATION LOCK.—William Johnson, Milwaukee, Wis.

I claim, 1st, Guard, l, and fence, h, in combination, with plate, L, substantially as described.

2d, The stop, O, held in slot, P, by shaft, T, in combination with tumbler, U, substantially as and for the purpose set forth.

3d, Key bit, Y, socket, Z, rubber ring, a, and nut, b, in combination with key stem, X, substantially as described.

84,193. — APPARATUS FOR ROASTING COFFEE. — William Johnston and John D. Flansburgh, Philadelphia, Pa.

We claim the elevated condenser, C, with its valve, c', the tube, D, and the tube, E, in combination with the hollow perforated sliding shaft, a1, the roasting vessel, A, and the furnace, B, the said parts being constructed and arranged to operate together as and for the purpose set forth and described.

84,194.—CULINARY VESSEL.—A. C. Kasson (assignor to himself and Nelson C. Gridley), Milwaukee, Wis.

I claim, 1st, The vessel, B, provided with its central steam chamber or tube, I, with its openings and slides and a series of compartments, C, constructed and arranged to operate substantially as described.

2d, The vessel, A, provided with the compartment, F, and the drip chamber, G, substantially as and or the purpose set forth.

3d, The combination of the vessels, A and B, the latter having the annular flange, t, fitting into the drip chamber, G, of the former, when said parts are constructed and arranged for joint operation, substantially as set forth.

81,195. — PETROLEUM STILL. — Edward G. Kelley, New York city.

I claim, 1st, The gate, F, arranged in combination with the two vessels, B C, to regulate the gravity of the products of distillation, substantially as and for the purpose herein shown and described.

2d, The petroleum still, consisting of the cylinder, B C, the latter having the shells, D, and the former being provided with the automatic indicator, I J, all made and operating substantially as herein shown and described.

84,196.—REFRIGERATOR.—Theodore Dwight Kellogg, New York city.

I claim the combination of the casing, B, lining B, ice chamber, G n, grating, g, strips, b b b' b', openings, c c, boxes, C C, and wire cloth, W W, all constructed, arranged, and operated in the manner and for the purpose set forth.

84,197.—TELEGRAPH INSTRUMENT.—George W. King, Georgetown, D. C.

I claim the core, D, acting as an armature, and oscillating in the helix, B, when pivoted to the supporting spring, I, in the manner and for the purpose herein described.

84,198.—APPARATUS FOR HOLDING SHEEP.— Giles D. A. Krigbaum, Zanesville, Ohio.

I claim the sheep-holding table, A, provided with the holes, a, the legs, B, and pivoted levers, b, notched to coincide with the holes in the table, all arranged and operating as described, whereby the sheep is suspended beneath the table, with its feet clamped in the holes, a, by the levers, b, as herein set forth for the purpose specified.

84,199.—WAGON TOP BOW.—S. C. La Halt, P. Listeman, and C. Hadley, Collinsville, Ill. Antedated November 9, 1868.

We claim arranging the central hoop, A, in hinged parts, a a1 and a2, and the end hoops, B, in hinged parts, b b1 b2 and b3, so that the said parts may be folded together into small compass, substantially as set forth.

84,200.—BOX.—Joseph J. Leighton, Boston, Mass.

I claim a round or cylindrical wooden box, composed of two or more layers of wood wound spirally around in opposite directions, and glued or otherwise secured together, substantially as herein specified.

84,201.—LOW WATER ALARM FOR BOILERS.—Edgar W. Mandeville (assignor to himself and Charles D. Johnson), Ithaca, N. Y.

I claim, 1st, The faucet, E, as arranged and constructed, whereby the opposite ends of the same receive the two pipes, G and H, one from the upper and the other from the lower part of the globe, E, as set forth.

2d, The construction of the faucet, B, with reference to the pipes, G and H, and the arrangement of the steam passage in the faucet leading to the whistle, whereby, when the globe, E, is full of water, no steam can pass to the whistle, but when empty, the turning of the faucet open the passage, and the whistle gives the alarm.

3d, The arrangement of the direct connection between the globe, F, and faucet, B, by the lever, C, whereby to operate these several parts, in combination, through the three parted passage in the faucet, as set forth.

84,202.—HYDRANT.—J. W. Marshall, Williamsburg, N. Y.

I claim the plug, D, with openings of supply, L, and waste discharge, M, in combination with the plug seat, C, spiral spring, E, and hand lever, N, operating together in manner substantially as and for the purposes described and set forth.

84,203.—WATER WHEEL.—Albert M. Maynard, Savoy, Mass.

I claim, 1st, The chutes, C, gates, D, diaphragm, B, and external barrel, A A, in combination with the turbine wheel, all constructed and arranged to operate substantially as described.

2d, The combination and arrangement of the V-shaped buckets, b, within the box, a, diaphragm, d, hoop, e, external band, A, diaphragm, B, carrying the sleeve, n, the collar, m, rods, l, chutes, C, and gates, D, as herein described, for the purpose specified.

84,204.—WASH BOILER.—Antoine Michel (assignor to himself, James S. Hannan, and Napoleon Moisau), St. Louis, Mo.

I claim, 1st, The arrangement of a heating flue, B, within each conducting pipe, C, for the purpose of accelerating and directing the flow of fluid.

2d, The combination of the vessel, A, its flues, B. duct, C, perforated at c, and discharging head, D, perforated at d, substantially as and for the purposes set forth.

84,205.—SHEET METAL ROOFING.—Ezekiel Mills, Baltimore, Md.

I claim the continuous metallic strips, jointed and coated by the process herein described.

84,206. — OSCILLATING STEAM ENGINE. — Frank Millward (assignor to himself, Dexter D. Hardy, and Henry C. Dart), Cincinnati, O.

I claim, 1st, The combination and arrangement of the frame, J, cylinder A, and V-shaped joint or hinge, substantially as shown and described.

2d, The arrangement of the pivots, K and L, by which the wear between the parts thereof may at any time be taken up, substantially as shown and described.

3d, The arrangement of the adjusting screws, M N, with reference to the V-shaped pieces K and L, for the purpose of taking up lost motion, and preserving the pivots in line.

4th, The oscillating side pipes, E G, and flexible tubes, I, for the purpose specified.

5th, The arrangement of the independent valve motion, P Q R S, or its mechanical equivalent, for the purpose of reciprocating the valve the short distance equal only to the "lap" of the valve, and the slight additional distance necessary to give a proper "lead" to the engine, substantially as described.

84,207.—FRUIT BASKET.—Charles Moore, Stratford, Conn.

I claim a fruit basket, constructed out of a single piece of sheet metal, cut and swaged up in the desired shape, substantially as shown and described.

84,208. — MACHINE FOR THE MANUFACTURE OF ELASTIC ROLLS AND TUBES.—Joel Moulton, Boston, Mass.

I claim, 1st, A machine so constructed and operating as to hold and rotate the roll shaft, and to cause the elastic material and its accompaniments to be wound about such shaft, and condensed or tightly driven thereon, for the purpose substantially as before explained.

2d, As an appurtenance or a part of the above described machine, a device for folding and maintaing, in an upright position, the elastic material as it is fed to the shaft, and also for introducing into the fold of the elastic material a metallic wire or string, for the purpose as before premised and described.

3d, For the purpose of condensing the folds of elastic material about the shaft, and for supporting one end of it in position while winding, the combination and arrangement of the case, c, with its cam groove, i, and the circular carrier, f, with its bunters, g g, etc., the whole being arranged and operating essentially as herein shown and described.

4th, In combination with the last described arrangement of parts, the sliding carriage, p, with its shaft, supporting chuck or bearing, o, such chuck being applied and operating as before referred to and described.

5th, Applying the auxiliary frame, c, to the main frame, at an angle to its longitudinal axis, in manner and for the purpose as herein shown and explained.

6th, The combination and arrangement of the endless bands, b3 b3, and the rollers, v v, etc., or their equivalents, for producing the same result, in combination with suitable supporting and feeding rollers, as and for the purpose before set forth and exhibited.

7th, The general combination and arrangement of the bunters, g g, etc. and the shaft supporting and operating adjuncts, the sliding carriage, p, and the mechanism for folding and "wiring" the elastic material or strips, the whole operating together to produce results before set forth and explained.

84,209.—METHOD OF DETACHING RUBBER ARTICLES FROM THE MOLDS IN WHICH THEY ARE VULCANIZED.—Joel Moulton, Boston, Mass.

I claim, 1st, As a machine for loosening the adhesion of vulcanized articles to their molds, the employment of the clearing rods, c c', so arranged and operated as to produce this effect by their combined rotary motion and longitudinal movements; and

2d, Supporting the clearing rods, c c', within or by means of the dually arranged sliding head stocks, a a', and mandrels, b b', or their equivalents, the head stock and mandrels being actuated by the pinions, d d', and pinions, l l', or other mechanical devices, and the whole operating together as described; and

3d, The general combination and arrangement of the dually arranged head stocks, a a' supported substantially as described, with the mandrels and clearers connected, as explained, the twin or dually arranged pinions, d d', and l l', and gears, g g', and p p', and q q', the shafts, h r m, and m', the posts, f f', the cradle or crutches, n u', being adjuncts or important details of the machine, the operation and general arrangement of the above described combination being as hereinbefore shown and elucidated.

84,210.—LIGHTNING ROD.—David Munson, Indianapolis, Ind.

I claim the lightning conductor, composed of the sections, A, formed and secured together as and for the purpose set forth.

84,211.—STEAM VALVE.—Francis S. Pease, Buffalo, N. Y.

I claim, 1st, The oscillating steam valve, consisting of two segments, V and V', constructed and operating as and for the purposes described.

2d, The combination and arrangement of the packing, L, and the slots, v v, in the valve, V V, substantially as and for the purposes explained.

84,212.—THILL COUPLING.—Levi Pentz, Canton, Ohio.

I claim 1st, The rubber block, G, when constructed with concave front face, d, upper rear flange, a, and lower side and rear flanges, c b c, and used in combination with the thill iron, H F H, and clip arm, B, constructed as specified, substantially as and for the purpose specified.

2d, The combination of the rubber block, G, constructed as specified in first claim, the thill iron, H F H, with elliptical pin, E, and the clip, A, with arm, B, provided with the slot, D, hole, C, and curved wedge part, n, the several parts being arranged in the manner and for the purpose herein specified.

84,213.—POCKET LANTERN.—George W. Putnam, Peterborough, (town of Smithfield,) N. Y. Antedated November 7, 1868.

I claim the lantern, constructed as described, adapted to receive the case, H, containing the candle and match chamber, M, in such a manner as to leave an air chamber, U, containing the sliding handle, P, between said case and lantern, to prevent the heat generated in the latter from communicating with the chambers, M, as herein described, for the purpose specified.

84,214.—FRUIT JAR.—Nat. Raymer, New Sterling, N. C.

I claim, as an article of manufacture, a stopper or cork for fruit jars, made as described, viz, furnished with a short metallic tube, through which the air may be readily drawn, and by the pressing together of which the jar is hermetically sealed.

84,215.—OIL BOX.—J. W. Rhoades, Clyde, Ohio.

I claim the combination of the oil-box, A, cut-off, C, tubes, c2, and d, and shoulder, f, all constructed, arranged, and operated substantially as and for the purpose set forth.

84,216.—COAL SIFTER.—C. K. Rice, Marlborough, Mass.

I claim, 1st, The combination with the ash box, A, and coal box, B, of the sieves, C E and D H, substantially as and for the purposes set forth.

2d, The combination and special arrangement of the sieves and frames, C, and D, in respect to each other and the box, B, substantially as shown and described.

3d, The combination of the projection, b, and pin, a, with the box, B, and sieves, C and D, as shown and described.

84,217.—FRUIT JAR.—S. B. Rowley, Philadelphia, Pa.

I claim the combination of the screw ring, D, and its flange, j, the thin metal cap, B, and its flange, h', the rib, d, shoulder, b, and screw thread, a, of the jar, and the gum ring, h, the whole being constructed, arranged and adapted to each other, as and for the purpose herein set forth.

84,218.—SPINNING JACK.—Jacob Sands, Waterloo, N. Y.

I claim, 1st, The combination, with the sliding block, A, trigger, f, spring-catch, l, and belt shifter, k, of the vibrating catch, d, on the carriage, when arranged substantially as and for the purpose described.

2d, The combination, with the spring latch, i, and belt shifter, k, of the weighted lever, n, when arranged substantially as and for the purpose described.

3d, The combination with the sliding catch, i, and belt shifting slide, k, of and lever, m, of the projection, r, on the carriage, when arranged substantially as and for the purpose described.

84,219.—MANUFACTURE OF GAS FROM VOLATILE LIQUIDS.—Charles A. Seely, New York city.

I claim, 1st, The process of generating a gas or vapor of high tension, for lighting and heating purposes, as described.

2d, The combination of the generator and the pipes or other receptacles containing hot water as described.

3d, The combination of the generator with the escape pipe and stop-cock as described.

4th, The prevention of condensation in the gas conducting pipes, substantially as described.

84,220.—GENERATING AND APPLYING CARBONIC OXIDE FOR Treating Metals.—Thomas Shaw, Philadelphia, Pa.

I claim the employment of hydrocarbon-fluids for the purpose of generating carbonic oxide, for operating on heated metals, as descried.

84,221.—POWER HAMMER.—Thomas Shaw, Philadelphia, Pa., assignor to himself and Phillip S. Justice.

I claim, 1st, The combination of the hammer, flexible stray, links, spring, walking beam, connecting rod, and crank shaft, substantially as herein described.

2d, The method, substantially as herein described, of simultaneously tightening the driving belt and releasing the friction or clutch belt, so as to suddenly start the machine, and by a reverse movement to as quickly stop the machine.

84,222.—HYDRANT AND GAS-PIPE STOP.—Frederick Shickle, (assignor to Shickle Harrison & Co.), St. Louis, Mo.

I claim the stop box, A, cap, B, and their lug, A', and pivot pin, b b1, when constructed and arranged as and for the purpose herein set forth and described.

84,223.—INSTRUMENT FOR AFFIXING STAMPS.—C. B. Sill (assignor to himself and John Goldsborough), Wilkins, Pa.

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I claim, the combination of the cutter and affixer, D, sponge, a, a spring feed, and the within-described devices, or their equivalents, through the medium of which the spring feed is "set" on the downward movement of the affixer, as and for the purpose described.

84,224.—FIRE-ARM.—Charles Slotterbek, San Francisco, Cal.

Antedated May 18, 1868.

I claim the combination and arrangement of the plate, B, springs, d i and l, trigger, k, sere, g, and hammer, f, when operated in the manner substantially as shown and described and for the purpose set forth.

84,225.—PROCESS FOR PRINTING IN COLORS.—Hiram F. Smart, Worcester, Mass.

I claim the mode of printing in colors from a single plate or engraving, substantially as and for the purpose described.

84,226.—REGISTER FOR TIME AND PRICE.—Kilburn Smith, Lowell, Mass.

I claim, 1st, The circular flange, F, in combination with the moving dial, A, in the manner and for the purpose set forth.

2d, The outer flange, H, in combination with the stationary circles of figures and indicating lines for the purpose and substantially as described.

3d, The pointer stands, E, having each a point, d, when used in combination with the flanges, F or H, and the moving dial, A, or the stationary figured circle between said flanges, for the purposes and in the manner substantially as described.

4th, The pivoted arm, J, in combination with the dial, I, for the purpose and substantially as described.

84,227.—LATCH.—Albert Spangler, Philadelphia, Pa.

I claim the sliding face plate, E, with its slots, e' and e", in combination with the loose collar, D, and fixed shank, C, and the sliding spring bolt, F, the said parts being constructed and arranged so as to operate as and for the purpose described.

84,228.—TARGET.—William Stein, Camden, N. J.

I claim, 1st, The swinging plates or arms, C C, hinged or pivoted to the rotating frame or disk, B, substantially as herein shown and described, to form a target in which the aim will automatically indicate when it is hit, as set forth.

2d, The rotating frame or disk, B, carrying the hinged or pivoted plates, C, in combination with the incline, D, for automatically resetting the plates, C, substantially as herein shown and described.

3d, The screen, E, having the aperture, g, in combination with the rotating frame, B, and with the plate, C, hinged or pivoted thereto, as set forth.

4th, An automatically adjusting target consisting of the rotating frame or disk, B, of the hinged or pivoted plates or aims, C, of the stationary incline, D, perforated screen, E, and ball arrester, F, all arranged in combination with each other, and made and operating substantially as herein shown and described.

84,229.—MACHINE FOR SHARPENING SAWS.—A. R. Stewart, Douglas Harbor, New Brunswick.

I claim, 1st, The combination and arrangement of the table, b, adjustable saw rest, n, pivoted arm, c, vertical shaft, d, slotted segment, h, segment, k, and sector slide, m, all constructed and operating substantially as herein described for the purpose specified.

2d, The adjustable guides, r r, and the wedges, t t, connected with the saw rest, combined with the stud, s, on the table, b, constructed, arranged and operating as described.

84,230.—EXCAVATOR.—Barna T. Stowell, Quincy, Ill.

I claim, 1st, The cutters, m m, when constructed in the sinuous form described and shown, and attached to the rotary cylinder, G, in the manner specified.

2d, The arrangement of the disk, J J', connecting bars, M M, scraping blades, N N, and sinuous cutters, m m, when the several parts are constructed in the manner described.

3d, In that class of excavators in which the rotary cutting cylinder operates to move the machine forward in the manner herein described, the arrangement of such cylinder horizontally across the machine in front of an inclined apron, C, so that the cylinder shall cut the dirt and throw it back upon the apron, while at the same time, it draws the machine forward, substantially as described.

4th, The arrangement of the horizontal rotary cylinder, G, apron, C, wheels, D D, frame, E, lever, F, and side cutters, P P, substantially as described.

84,231.—COMBINED RAKE AND HOE.—Henry Thacker, Oneida, N. Y.

I claim as a new article of manufacture, the combined rake and hoe, cast in one piece, the cross head, A, being sharpened between the tines, B, to form a straight cutting edge, as herein described for the purpose specified.

84,232.—BEE HIVE.—J. H. Thurston, Rainsborough, Ohio

I claim the slide, n, and lever, o, pivoted in the recesses cut in the partition, b, between the same and the spare honey boxes, C C', said lever extending to the outside of the hive whereby the capacity of the opening, l m, is regulated, or communication closed between the boxes, C, and chamber, a, as herein shown and described for the purpose specified.

84,233.—GUN LOCK.—Nichael Tromly, Washington, D. C.

I claim, 1st, A hammer constructed with the parts, A and B, operating together, substantially as described.

2d, The combination of said hammer with the nipple, n, and guard, G, in the manner set forth.

3d, A hammer, constructed with the depression, m, shoulders, i i, and lip or projecting plate, o, substantially as described.

84,234.—HYDROCARRON BURNER.—Louis Verstraet, Paris, France.

I claim, 1st, The reservoir, A, constructed with a double casing or wall, and filled in with the absorbent, C, substantially as and for the purposes described.

2d, Withdrawing the vapor which rises from the petroleum, or other mineral oil or liquid, from the reservoir, preventing thereby its escape into the atmosphere, and the accumulation thereof in the reservoir, substantially as described and for the purposes set forth.

3d, Collecting and using in the boiler the water produced by the condensation of the vapors in the smoke flues, substantially as described.

4th, Discharging into the furnace and utilizing as fuel the vapors rising from the oil in the reservoir, substantially as shown and described.

5th, Producing a current of air through the reservoir, in contact with the oil therein, substantially as and for the purposes described.

6th, The filling, C, in combination with an oil reservoir, substantially as and for the purposes described.

7th, The air discharge tube, E', closed at its base, having a conical end, perforated at e, and surrounding the closed conical ended tube. E", in such a manner as to leave an annual space, m, between them, and arranged with relation to the air supply pipe, F, and gas pipe, N, as herein described, for the purpose specified.

84,235.—PAPER MAKING MACHINE.—James Viney, Manchester, N. H.

I claim, 1st, Extracting the water or moisture, to a greater or less extent, from the pulp on the wire cloth or felt apron, on its way to the pressing rollers, by the removal of atmospheric pressure, as described, or in any equivalent manner.

2d, The adjustable slides, E, on the boxes, A, by which the aperture in the top of the box is made to correspond with the width of the paper, substantially as described.

84,236.—MACHINE FOR PICKING WOOL.—Wm. Wadsworth and E. H. Semple, St. Louis, Mo.

We claim the combination of the cleansing cylinder, B, roller, C, arranged in adjustable bearing boxes, c3, and having radial arms, C, and brushes, c1 c2, the slide, F, and slotted floor, F', all constructed, arranged, and operating as and for the purposes set forth.

84,237.—WIND WHEEL.—R. Waite, Blue Earth City, Minn.

I claim the wind wheel constructed as described, of the case, A, having the flanges, B C, the draft regulator, D, horizontal shaft, G, and the spiral wind wheel, E, having a variable diameter and pitch, all arranged and operating as described, for the purpose specified.

84,238.—CULTIVATOR.—Thomas Waite, Plymouth, Ohio.

I claim the side beams, C, when provided with slots, D, for the insertion and adjustment of the standards, E, in combination with the beam, A, for the purpose set forth.

84,239.—STEAM WHISTLE.—Bernhard Weinmann, Cincinnati, Ohio.

I claim, 1st, The adjustable piston, E, arranged in the upper end of a steam whistle, substantially as herein shown and described.

2d, A steam whistle consisting of the tube, A, plug, B, which has the stem, d, head, e, and the adjustable piston, E, all constructed substantially as herein shown and described.

84,240.—SPRING BUT.—William Wells, Ashtabula, Ohio.

I claim the pawl, 1, and the ratchet teeth, h, when arranged substantially as and for the purposes herein shown and described.

84,241.—DESICCATED COCOANUT.—Giles B. Williams (assignor to Elisha M. Allen), New York city.

I claim an improved article of confection consisting of desiccated cocoanut meat combined with sugar and the bicarbonate of soda, substantially as set forth.

84,242.—FROTH ARRESTER FOR BEER GLASSES.—Johann Winkler, Hudson City, N. J.

I claim the oval froth arrester, A, provided with a notch, b, and arranged substantially as and for the purpose described.

84,243.—ELECTRO-PLATING.—Justin P. Woodworth, Brooklyn, N. Y.

I claim the method substantially as set forth, of depositing different thicknesses of plating or metallic coating on different portions of an article at one operation, by obstructing and deflecting the electric bath in its passage between the two poles, substantially as described.

Also, the rack or holder, fig. 1, or its equivalent, for holding the articles to be plated properly, and for receiving and adjusting by suitable means the said obstructing device, substantially in the manner described.

84,244.—BEER COOLER.—John Yates and Edgar Deuell, Brooklyn, N. Y.

We claim, 1st, Connecting the ends of the pipes or tubes, A, by means of boxes, C, divided into compartments by means of partitions, a, the ends of the pipes or tubes passing through suitable standards or plates, B, into the compartments of said boxes, substantially as shown and described.

2d, Inclosing the series of pipes or tubes, A by means of doors, E' E', hinged to one of the boxes, C, substantially as and for the purpose herein set forth.

84,245.—MANUFACTURING BOOTS AND SHOES.—August Destouy, New York city.

I claim the within described method of manufacturing boots and shoes, that is to say, securing the insole by a stitch whose parts are twisted and crossed in or at each awl hole, substantially as and for the purpose herein described and represented.

84,246.—MACHINE FOR THE MANUFACTURE OF PAPER BOXES.—Richard Smith, Sherbrooke, Canada.

I claim, 1st, A plugger so constructed as automatically to admit air beneath its lower end previous to its withdrawal from a cavity of the completed box or other hollow article, substantially in the manner and for the purpose set forth.

2d, The formation of the sides of the box by the sudden displacement of the pulp in the mold, by the introduction of the plunger into it by a quick motion, substantially in the manner described.

3d, The combination and arrangement of the piston packing, r, air passage c, and valve, v, in the manner and for the purpose specified.

4th, Discharging the completed box or other hollow article from the bottom of the mold, substantially as set forth.

5th, The molds, H, made with removable bottoms and permanent perforated linings, as distinguished from removable linings, substantially in the manner specified.

6th, The ways, W, in combination with the common bed plate of the molds, H H', for the purpose of allowing the latter to have a reciprocating movement to bring the molds alternately beneath the plunger, in the manner and for the purpose described.

7th, Forming a box or other hollow article from pulp, by forcing a plunger down into the mold containing the pulp of which the box or other article is to be made, as set forth.

REISSUES.

65,794.—MACHINE FOR FILLING CYLINDRICAL MOLDS FOR RUBBER GOODS.—Dated June 18, 1867; reissue 3,193.—John W. Cobb, Melrose, (for himself), and Edwin A. Hill, (assignee of John W. Cobb), Quincy, Mass

We claim the combination of a molding cylinder, M, and a grinding roller, R, substantially as described, and mechanism for revolving the two at different speeds, as and for the purpose explained.

Also, the combination of the pressure roller, S, the molding cylinder, M, and a grinding roller, R, substantially as described, and mechanism for revolving the molding cylinder and grinding roller at different speeds, as and for the purpose specified, the pressure roller having applied to it mechanism for revolving it at the same speed with the molding cylinder.

19,855.—ICE PITCHER.—Dated April 6, 1858; reissue 3,194.—Henry G. Reed, George Brabrook, and Henry H Fish (trading as "Reed & Barton"), Taunton, Mass., assignees of Ernest Kauffman.

We claim, 1st, An ice pitcher having an attachable and removable lining, and a continuous or unbroken outer wall and bottom, when so constructed that the lining can be attached or removed through the top of the pitcher.

2d, The ice pitcher having the inner portion or lining, B, fitted to the outer portion or casing, A, with screw threads, or their equivalents, which make a tight joint, but provide for its ready removal and renewal, and replacement or renewal, as set forth.

70,272.—MODE OF LIGHTING STREET GAS BURNERS.—Dated October 29, 1867; reissue 3,195.—E. P. Russell (for himself) and Porter Tremain, (assignee of E. P. Russell,) Manlius, N. Y.

I claim a small supplemental burner, A, to be kept burning constantly, and the pipe leading thereto, when operating in connection with a main burner, substantially as and for the purposes set forth.

37,469.—MACHINE FOR STIRRING LARD.—Dated January 20, 1863; reissue 3,196.—William J. Wilcox, New York, N. Y.

I claim, 1st, The employment or use, for the purpose of stirring lard, of perforated or slotted dashers, E E', attached to staves, F F', which are secured to reciprocating rods or bars, C C', moving in opposite directions, all constructed, combined, arranged, and operated substantially in the manner herein shown and described; and also, the last above-mentioned parts, in combination with said tank, constructed, and operated substantially as above described.

2d, The combination of two or more dashers, moving backward and forward in the tank, in opposite directions to each other, substantially as described for the purpose set forth.

36,159.—SEEDING MACHINE.—Dated August 12, 1862; reissue 3,197.—Division A.—William M. Jones and D. W. Hall, Horicon, Wis., assignees, by mesne assignments, of W. M. Jones and S. E. Tyler.

We claim, 1st, The chamber or recess, n', formed on the inside the cap, K, and located between the seed opening in front of the cap, to allow the edges of the buckets or partitions to pass up under the cap without injuring the seed, substantially as described.

2d, Forming and arranging the cap, so that a space shall be left at the rear for the seed to begin to fall from the buckets as soon as they are turned far enough to cause the the seed to roll or slide over their edges, substantially as described.

15,659.—HARVESTING MACHINE.—Dated September 2, 1856; reissue 673, dated March 15, 1859; reissue 3,198.—Division A.—William A. Kirby, Auburn, N. Y.

I claim, 1st, The combination of the single plate, H, with the main wheel, substantially as and for the purpose described.

2d, Also the combination of the main wheel, K, single plate, H, and rim, L, when connected together and operating in the manner and for the purpose set forth.

3d, Also, placing a vibrating wheel on the outside of the main frame, or so that the outside of said frame does not bear on the outside of the wheel, in combination with the triangular shaped frame on the inside of the wheel, substantially as described.

4th, Also, hanging the seat to the plate, H, and to the standard, S, in the manner and for the purpose set forth.

5th, Also, a hinged lever seat, and outside supporter therefor in combination with a wheel having no outside frame or support, substantially as herein represented.

6th, Also, in a harvesting machine having no outside supports to the driving wheel, attaching a support for the driver's seat to the outer end of the axle of said wheel, substantially as described.

7th, Also, in a harvesting machine having its frame in two parts, and hinged together around the box containing the pinion shaft at one point, the plate, segment, and holding mechanism, at another point, for sustaining and holding the frame at any desired hight, substantially as described.

15,659.—HARVESTING MACHINE.—Dated September 2, 1856; reissue 673. Dated March 15, 1859; reissue 3,199. Division B.—William A. Kirby, Auburn, N. Y.

I claim, 1st, In a harvesting machine, with its frame wholly on one side of the driving wheel, and the driving wheel having no outside support, a foot support for the driver on the side of the wheel opposite the frame, substantially as described.

2d, Also, in a harvesting machine with a frame wholly on one side of the driving wheel, and said driving wheel having no outside support, the making of the frame in two parts, one of which supports the driving wheel and a portion of the gearing, and the other part carries the other portion of the gearing, and forming a projection on one part of the frame around the pinion shaft, and a corresponding opening in the other part, which will pass over and around said projection, thus forming a joint, the center of which is coincident with the center of the pinion shaft, for the purpose of holding their gearing in position longitudinally, substantially as described.

3d, Also, in a harvesting machine, having its frame in two parts, one of which supports the driving wheel and a portion of the gearing, and the other part carries the other part or portion of the gearing, and jointed together by the projection on one and the opening in the other, as described, the use of the lug, flange, or guide, a, on one part of the frame, and a corresponding recess n, on the other part thereof, in which said lug, flange, or guide works, for the purpose of holding the two parts, with their gearing in position laterally, so as to prevent motion to either side, substantially as described.

64,554.—FRICTION PAWL.—Dated May 7, 1867; reissue 3,200 Jos. Moore San Francisco, Cal.

I claim as an improvement in hoisting apparatus, a pulley, which shall be on the one hand, under the control of a brake, bearing upon its outer surface and, on the other hand, connected with the shaft by the pawl and ratchet device, or its equivalent, within the puller, substantially in the manner and for the purposes set forth.

64,139.—MANUFACTURE OF STARCH SUGAR.—Dated April 23, 1867. reissue 3,201.—Narcisse Pigeon, Brooklyn, N. Y.

I claim, 1st, The within-described process of manufacturing a pure sirup, and crystallizable sugar sirup, from prepared fecula, cellulose, or other similar matter, by freeing it from salts, empyreumatic oils, &c., substantially as described, and by treating the matter so as to convert the whole dextrine, cellulose &c., into crystallizable sugar sirup, substantially in the manner above described.

2d, The within-described process of manufacturing a hard crystallized sugar from fecula, or other similar substances, substantially as herein set forth.

3d, The above-described part of my process, which consists in freeing the sirup of any acid, by the double neutralization, substantially in the manner above described.

50,016.—WEATHER STRIP FOR DOORS AND WINDOWS.—Dated Sept. 19, 1865; reissue 3,202.—Benjamin B. Savary, Boston, and Frederick O. Raymond, Haverhill, Mass., assignees, by mesne assignments of Isaac F. A. A. Lynch.

We claim, 1st, A weather strip, composed of two strips or pieces of wood and an interposed projecting strip of vulcanized rubber, or equivalent elastic material, united by tacks, or otherwise, substantially as herein set forth.

2d, The employment, with a weather strip of otherwise ordinary or suitable construction, of vulcanized rubber, held in and arranged to project from face of weather strip in contact with the door or other part to which said strip is affixed, substantially as and for the purposes herein set forth.

3d, The improved weather strip, as made with the strip of elastic material or india-rubber, c c, to project in opposite directions from the two faces of the divided holder or molding, a b, substantially in the manner shown, and described.

4th, The combination with the elastic strip, projecting from the rear face of the molding, as described, of the rebate, d, made in the molding, and arranged, with relation to the said elastic strip, substantially as specified.

56,457.—MACHNE FOR POLISHING ENAMELED PAPER.—Dated July 17, 1866; reissue 3,203.—Samuel Shepherd and Joseph Greeley, Nashua, N. H., assignees, by mesne assignments, of Samuel Shepherd and Ammi M. George.

We claim, 1st, The combination of a rotary polishing device with an endless carrying device, moving at a lower velocity than the polishing device, and supporting table, bed, or ways to the carrying device, substantially as herein set forth, for the purpose specified.

2d, the combination, with an endless carrying device to the paper or other material to be operated on, of a polishing device, arranged to reciprocate across the line or plane of feed, substantially as specified.

3d Providing an elastic bearing for the paper or material under the rotary polishing device, by making either the endless carrying device, or support upon which it rests, elastic, substantially as herein set forth.

4th, Giving the rotary polishing device a reciprocating movement transversely to the feed, as produced by the endless carrying device, simultaneously with its rotary motion, substantially as herein set forth, for the purpose specified.

5th, The pressing plate, T, applied in relation with the rotary polishing device, and endless carrying device, and support or ways to the latter, substantially as herein set forth, for the purpose specified.

DESIGNS.

3,236.—PRINTERS' TYPE.—David Bruce, Brooklyn, N. Y., assignor to David Wolfe Bruce, New York City.

3,237.—RAY SHADED PRINTERS' TYPE.—David Wolfe Bruce, New York City.

3,238.—CLOCK CASE.—Paschal Converse, New Haven, Conn.

3,239.—COACH LAMP GLASS.—James H. Downs, (assignor to C. Cowles & Co.), New Haven, Conn.

3,240.—COACH LAMP.—James H. Downs, (assignor to C. Cowles and Co.), New Haven Conn.

3,241.—CARPET PATTERN.—Israel Foster, Philadelphia, Pa.

3,242.—CARPET PATTERN.—Israel Foster, Philadelphia, Pa. Two Patents.

3,243.—FRUIT JAR.—Alonzo French, Philadelphia, Pa.

3,244.—ORNAMENTAL TYPE FOR PRINTERS.—Julius Herriet, (assignor to David Wolfe Bruce), New York City.

3,245.—ORNAMENTED PRINTERS' TYPE.—Julius Herriet (assignor to David Wolfe Bruce), New York city.

3,246.—SCALE DISH.—John W. Kissam, New York city.

3,247.—LADIES' COLLARS AND CUFFS.—Robert Macdonald, New York city.

3,248.—FLOOR CLOTH PATTERN.—Charles T. Meyer, Bergen, N. J., assignor to Edward C. Sampson, New York city.

3,249.—CLOCK CASE.—Carl Muller, New York city.

3,250.—PRINTERS' FLOURISHES.—Conrad Reuter, Cincinnati, Ohio.

3,251.—TRADE MARK.—Edgar A. Robbins, Wrentham, Mass.

3,252.—CUSPADORE.—Samuel Roebuck, and John Roebuck, New York city.

3,253.—CLOCK CASE.—Solomon C. Spring (assignor to Welch, Spring & Company), Bristol, Conn.

3,254.—TRADE MARK.—David W. Storer, Bangor, Me.

3,255.—HARNESS TRIMMINGS.—Charles M. Theberath, and Jacob H. Theberath, Newark, N. J.

3,256.—BRANCH OF A GASOLIER.—James Frederic Travis, New York city.

3,257.—TRADE MARK.—Edwin H. Turner, Quincy, Ill.

3,258.—TRADE MARK.—Michael Werk, Cincinnati, Ohio.

3,259.—STEAM BOILER PUMP.—Leonard Egleston (assignor to Rumsey & Company), Seneca Falls, N. Y.

3,260 and 3,261.—TRADE MARK.—D. Foerster, Zanesville, O.

3,262.—STANDARDS OF A SCHOOL DESK.—Calvin W. Sherwood, Chicago, Ill.

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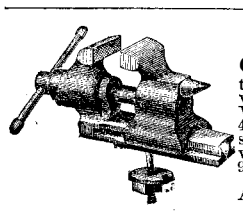

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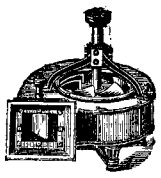

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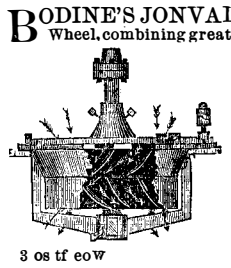

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